

Application of Technology to Transportation Operations In Biohazard Situations

Transportation Biohazard Operational Concept



US Department of Transportation
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Preface

The Federal Highway Administration (FHWA), Office of Operations is conducting a project called “Application of Technology to Transportation Operations in Biohazard Situations.” The goal of this project is to develop a more comprehensive and actionable understanding of the role of transportation during a biohazard emergency so that communities across the country can better plan for, respond to, and recover from such an incident.

As part of this project, this *Transportation Biohazard Operational Concept* has been prepared. It builds on the results of an extensive literature review, a dedicated program of outreach with members of the affected transportation, emergency management, public health and public safety communities, and a validation workshop conducted in July 2005 and sponsored by the Wisconsin Department of Transportation. This operational concept will be used to develop guidelines and a decision-support tool for state Departments of Transportation (DOTs). The operational concept will also be presented to the National Intelligent Transportation System (ITS) Architecture Team for consideration in defining additional functional requirements and user service agreements.

FHWA would like to thank the members of American Association of State Highway and Transportation Officials (AASHTO) Special Committee on Transportation Security (SCOTS) for their support in reviewing earlier drafts of the operations concept. We would also like to extend our special thanks to Mr. Jeffrey Western of the Wisconsin Department of Transportation, for hosting the validation workshop, and for sharing with FHWA’s research team activities being performed in Wisconsin to address biohazard events.

Transportation Biohazard Operational Concept Table of Contents

Section	Page
1.0 Introduction	2
2.0 Integrated Response Framework	4
3.0 Background	10
4.0 Transportation Authorities	17
5.0 Planning Situations and Assumptions	18
6.0 Transportation Role in Biohazard Event	24
7.0 Direction and Control	30
8.0 Communications	33
9.0 Public Information	34
Glossary	35
Appendix A: Strategic National Stockpile Fact Sheet	40
Appendix B: Sample State EOP Appendix for the SNS Program	44
Appendix C: Modular Emergency Medical System	49
Appendix D: Representative Scenarios	52

Transportation Biohazard Operational Concept

1.0 Introduction

Each state Department of Transportation (DOT) is charged with the provision of an efficient and safe transportation system that enhances economic competitiveness and livability in the state. State DOTs occasionally are subject to emergencies and disasters that can threaten a safe and secure environment for travel. While state DOTs have developed Emergency Operations Plans (EOPs) and incident specific annexes, procedures and training to address many potential emergencies, there is the perceived need for additional guidance in managing events related to the accidental or intentional release of biological agents.

These events may stem from the spread of microorganisms (bacteria, viruses, fungi) or toxins through the air as aerosols or in food or drink. A release affecting people could cause illness, death, fear, societal disruption, and economic damage. A release affecting agricultural plants and animals may primarily cause economic damage, loss of confidence in the food supply, and possible loss of life. A biohazard event could be caused by a terrorist attack or by an accidental release or contamination.

During response to these events, personnel from DOT districts and departments must coordinate with personnel from various public health, public safety, and emergency management agencies to perform a range of services. In these situations, unfamiliar tasks may have to be carried out in potentially threatening environments to protect motorists, employees, emergency responders, DOT vehicles and property, and surrounding communities.

The *Transportation Biohazard Operational Concept* has been developed to support the efforts of state DOTs in defining their organizational structure, roles and responsibilities, processes and policies for managing a biohazard event. The operational concept clarifies the transportation functions to be performed during a biohazard situation by specifying the processes through which these functions are accomplished.

The operational concept should provide a blueprint for building consensus among transportation, emergency management, public health, agriculture and veterinary medicine, and public safety stakeholders on critical issues involved in biohazard events. This includes identification of required planning and response activities; multi-jurisdictional mutual aid and operating agreements; selection of operational strategies, standards, protocols; communications interfaces; and the application of technology.

The operational concept will set a common vision to guide management of the transportation network during these events. It will be used to seek support from the emergency and transportation management communities, and to enhance the capabilities of current Intelligent Transportation System (ITS) technology to support these events.

The operational concept does not exist in a vacuum. It builds on existing transportation and community emergency response plans, emergency response procedures, training, drills and exercises. It also builds on recommendations from the public health, agriculture, and veterinary medicine communities regarding how best to manage these types of emergencies.

The operational concept addresses all phases of the emergency management life cycle, specified by the Department of Homeland Security (DHS) in the *National Response Plan* (December 2004):

- **Awareness** – steps taken to identify, confirm, and monitor an event;
- **Prevention** – steps taken to avoid an incident or to mitigate an incident's effects;
- **Preparedness** – steps taken in advance to reduce the potential loss from an event;
- **Response** – steps taken during or immediately after an event to save lives and property; and
- **Recovery** – steps taken to restore the affected areas to their normal status.

The operational concept assures a viable transportation biohazard response capability. It provides a valuable resource for state DOT planning, training, exercises and response.

Transportation Biohazard Operational Concept

1.0 Introduction – cont.

Using this Document

The *Transportation Biohazard Operational Concept* is organized into nine sections:

- **1.0 Introduction** – describes the need for and purpose of the operational concept and provides an overview of the document.
- **2.0 Integrated Response Framework** – identifies the other plans, procedures, training and agreements with which the operational concept must be integrated. Specifies links between the *Transportation Biohazard Operational Concept* and the state and state DOT Emergency Operations Plans and supporting agreements developed to address requirements in the National Response Plan and National Incident Management System.
- **3.0 Background** – establishes the context for the transportation role in supporting response to a biohazard event. Identifies those types of biohazard events of greatest concern to the transportation agency, and provides an overview of the activities that may be required to address them.
- **4.0 Transportation Authorities** – identifies the legal authorities vested in the transportation agency to perform specific activities that may be required during a biohazard event.
- **5.0 Planning Situations and Assumptions** – clarifies the situations and assumptions made by the transportation agency in developing the operational concept and in coordinating with the state Emergency Operations Plan.
- **6.0 Transportation Role in Biohazard Event** – identifies the activities that may be performed by the transportation agency for biohazard events during all phases of the emergency management life cycle specified in the National Response Plan.
- **7.0 Direction and Control** – specifies the leadership roles and assigned tasks of transportation personnel in carrying out the activities that may be performed by the transportation agency during a biohazard event. Also identifies the primary coordinating functions of other state, local and federal agencies in working with the state DOT to obtain transportation resources and support.
- **8.0 Communications** – identifies the state DOT's communications capabilities during a biohazard events and references the protocols and plans to be used.
- **9.0 Public Information** – explains how the state DOT will remain "plugged in" to the system established by responders for releasing information to the public and the media.

The *Transportation Biohazard Operational Concept* is designed to provide guidance for state DOTs in addressing each of these sections. State DOTs, which vary widely in their organizations, authorities and resources, may use the text provided in each section of the operational concept as a model, tailoring it to reflect their own unique characteristics and conditions.

A **Glossary** is also provided with definitions for key terms typically used in planning for biohazard events. **Appendix A** provides a Fact Sheet prepared by the Centers for Disease Control and Prevention regarding the Strategic National Stockpile. **Appendix B** provides a sample State Appendix to an Emergency Operations Plan describing the activities to be performed by various state agencies, including state DOTs, to request, receive, warehouse, deliver and dispense medicines and materials from the Strategic National Stockpile. **Appendix C** provides additional information on the Modular Emergency Medical System. **Appendix D** provides representative scenarios, illustrating how state DOTs could respond in three (3) representative biohazard events. Timeframes and specific actions are provided for each scenario.

Transportation Biohazard Operational Concept

2.0 Integrated Response Framework

This section of the Transportation Biohazard Operational Concept describes the existing response framework within which the state DOT's operational concept must be integrated. State DOTs may choose to use some or all of the information provided below to support development of this section in their operational concepts.

As identified by existing federal and state guidelines, the key elements of an effective response to a biohazard event include:

- Rapid detection of the outbreak;
- Swift agent identification and confirmation;
- Identification of the population at risk;
- Determination of how the agent is transmitted, including an assessment of the efficiency of transmission;
- Determination of susceptibility of the pathogen to treatment;
- Definition of the public health, medical, and mental health implications;
- Control and containment of the epidemic;
- Decontamination of individuals, if necessary;
- Identification of the law enforcement implications/assessment of the threat;
- Augmentation and surging of local health and medical resources;
- Protection of the population through appropriate public health and medical actions, including isolation and quarantine strategies;
- Dissemination of information to enlist public support;
- Assessment of environmental contamination and cleanup/decontamination of bioagents that persist in the environment; and
- Tracking and preventing secondary or additional disease outbreak.

To address these elements, response to any event involving biohazards will most likely occur within the emerging federal, state and local framework specified in the *National Response Plan* (December 2004) and the *National Incident Management System* (March 2004). This framework creates a standardized approach for incident management that enables the timely integration of federal resources into state and local response activities. Figure 1 provides a visual illustration of this framework.

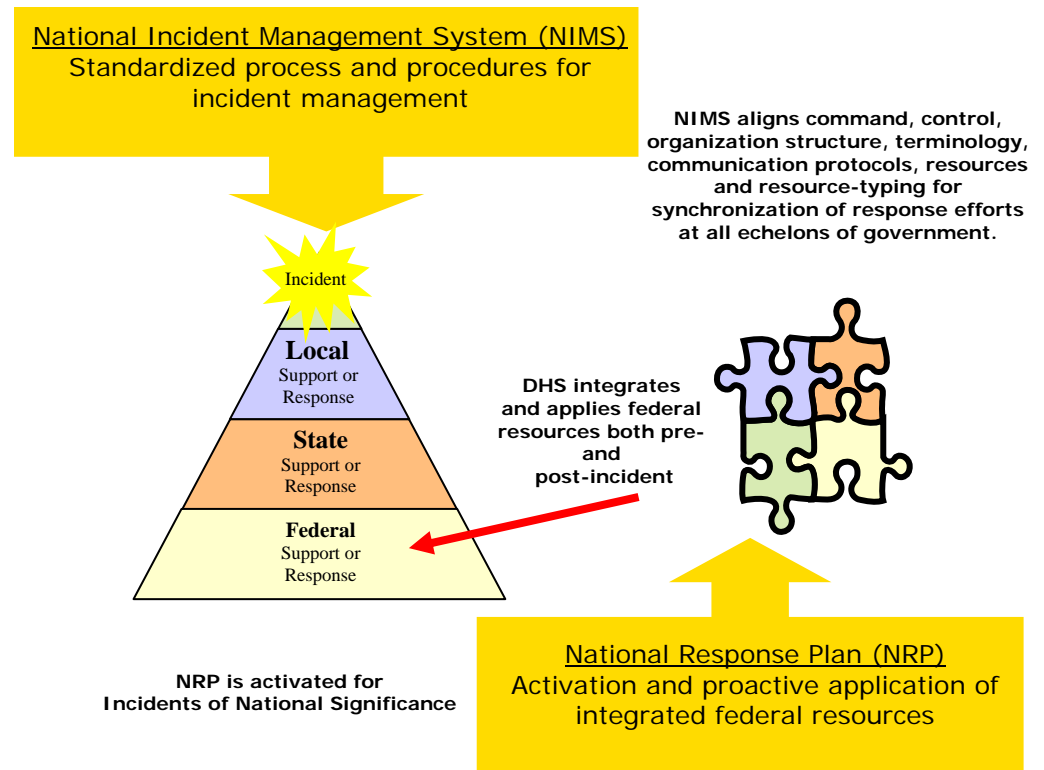


Figure 1: NIMS and NRP Framework

Transportation Biohazard Operational Concept

2.0 Integrated Response Framework – cont.

National Response Plan

For states and their executive agencies, such as state DOTs, the National Response Plan (NRP) requires development of an all-hazards Emergency Operations Plan (EOP) that consists of the following components:

- **The Base Plan** describes the structure and processes comprising the state's approach to domestic incident management designed to integrate the efforts and resources of federal, state, local, tribal, private-sector, and nongovernmental organizations. The Base Plan includes planning assumptions, roles and responsibilities, concept of operations, incident management actions, and plan maintenance instructions.
- **Appendixes** provide other relevant, more detailed supporting information, including terms, definitions, acronyms, authorities, and a compendium of supporting interagency plans.
 - Glossary of Key Terms
 - List of Acronyms
 - Authorities and References
 - Compendium of Relevant Interagency Plans
 - Process for State Declarations of Emergency under the Stafford Act
- **The Emergency Support Function (ESF) Annexes** detail the missions, policies, structures, and responsibilities of state agencies for coordinating resource and programmatic support in 15 specified functional areas. Each ESF Annex also summarizes the functions of ESF coordinators and primary and support agencies. ESF Annexes include the following:

- ESF #1: Transportation
- ESF #2: Communications
- ESF #3: Public Works and Engineering
- ESF #4: Firefighting
- ESF #5: Emergency Management
- ESF #6: Mass Care, Housing, and Human Services
- ESF #7: Resource Support
- ESF #8: Public Health and Medical Services
- ESF #9: Urban Search and Rescue
- ESF #10: Oil and Hazardous Materials Response
- ESF #11: Agriculture and Natural Resources
- ESF #12: Energy
- ESF #13: Public Safety and Security
- ESF #14: Long-Term Community Recovery and Mitigation
- ESF #15: External Affairs

- **The Support Annexes** provide guidance and describe the functional processes and administrative requirements necessary to ensure efficient and effective implementation of the EOP's incident management objectives. Support Annexes include: Financial Management; International Coordination; Logistics Management; Private-Sector Coordination; Public Affairs; Science and Technology; Tribal Relations; Volunteer and Donations Management and Worker Safety and Health.
- **The Incident Annexes** address contingency or hazard situations requiring specialized application of the NRP. The Incident Annexes describe the missions policies, responsibilities, and coordination processes that govern the interaction of public and private entities engaged in incident management and emergency response operations across a spectrum of potential hazards. These annexes are typically augmented by a variety of supporting plans and procedures, and include the following: Biological Incident; Catastrophic Incident; Cyber Incident; Food and Agriculture Incident; Nuclear/Radiological Incident; Oil and Hazardous Materials Incident; and Terrorism Incident Law Enforcement and Investigation.

Transportation Biohazard Operational Concept

2.0 Integrated Response Framework – cont.

State EOPs, compliant with NRP requirements were supposed to be developed by April 30, 2005 or, at the latest, during the state's next established cycle for updating its EOP. In the Base Plan and the ESF Annexes, the state and its executive agencies, including state DOTs, must also address adoption of the National Incident Management System (NIMS). NIMS addresses six areas, including:

- Command and Management;
- Preparedness;
- Resource Management;
- Communications and Information Management;
- Supporting Technologies; and
- Ongoing Management and Maintenance.

Among other things, NIMS requires adoption of the Incident Command System (ICS) as the local, regional and state incident/field management system. Requirements for NIMS implementation have been conveyed to state governments through a series of activities performed by the Federal Emergency Management Agency (FEMA), a department now located within the Department of Homeland Security (DHS). Full compliance with these requirements must be achieved by the end of Fiscal Year 2006.

To support the typing, categorization and management of resources, NIMS also adopts the 15 ESFs in the NRP. Building on these ESFs, the states and their executive agencies can identify coordinating, primary and support agencies. State DOTs are typically the coordinating/primary agencies for ESF #1: Transportation and may also fill this role for ESF#3: Public Works and Engineering. State DOTs typically support several other ESFs, including: ESF #2: Communications; ESF #4: Firefighting; ESF #6: Mass Care, Housing, and Human Services; ESF #7: Resource Support; ESF #9: Urban Search and Rescue; ESF #10: Oil and Hazardous Materials Response; and ESF #14: Long-Term Community Recovery and Mitigation.

Coordinated Transportation Planning

Based on this new federal framework, many state DOTs have developed (or are in the process of developing) EOPs and supporting procedures for their agencies. Further, many state DOTs have also committed to a program of training, drills and exercises to reinforce and test the effectiveness of their EOPs and procedures. EOPs developed by state DOTs will be coordinated with (and referenced in) state-wide EOPs and will govern how transportation aspects of emergencies requiring state resources will be managed for ESFs led and supported by state DOTs.

For each state DOT, the *Transportation Biohazard Operational Concept* must interface with the existing (or soon to be developed) EOP, building on established terminology, practices and employee training and expectations. Conformance to the *Biological Incident Annex* of the state EOP must also be ensured.

The *Transportation Biohazard Operational Concept* must also address other emergency plans and procedures developed by the state DOT, such as:

- Continuity of Operations Plans,
- Transportation Operations Center Plans and Procedures,
- Resource Management Plans and Procedures.
- Traffic Management Plans, and
- Hazard-Specific Plans.

Assuring conformance to these documents builds on the state DOT's existing capabilities and guarantees that a single, unified message is provided to employees and other agencies who work with the state DOT.

Mutual Aid and Memorandum of Understanding/Agreement

The *Transportation Biohazard Operational Concept* should also reflect the terms established among state DOTs and local, regional and other state agencies in Mutual Aid Agreements and other Memorandum of Understanding or Agreement (MOUs/MOAs). Formalization of these agreements is required in NIMS, and many local, regional and state authorities have already established these legal documents to govern the request for and sharing of resources during emergency events. References should be made to these documents as appropriate.

Transportation Biohazard Operational Concept

2.0 Integrated Response Framework – cont.

Coordination with ESF#8: Public Health and Medical Service and ESF#11: Agriculture and Natural Resources

In addressing biohazards events, it is also important that the plans and procedures developed by the state DOT are effectively coordinated with the response framework developed by the state to address ESF#8: Public Health and Medical Service and ESF#11: Agricultural and Natural Resources.

These ESFs should explain the local/regional/state emergency management structure established to perform critical activities associated with the identification and management of biohazard emergencies, including: medical surveillance and investigation, identification of biological agents, development of treatment and decontamination protocols, and specification of incident action plans and required response strategies.

As identified in these ESFs, the existing response structure for biohazard emergencies is led by municipal/county and state public health departments, emergency management agencies, public safety agencies, veterinary and agriculture departments, and elected officials.

These agencies have specialized resources and authorities to manage public health emergencies, including authorities to issue isolation and quarantine orders, to confiscate and destroy contaminated property, and to specify other actions to protect the public.

Two critical functions performed by these agencies with transportation impacts are the:

- Request for medicines and supplies provided in the Strategic National Stockpile (SNS); and
- Implementation of a Modular Emergency Medical System (MEMS).

Strategic National Stockpile: The SNS Program is committed to have “Push Packages” of medicine and medical supplies delivered anywhere in the U.S. or its territories within 12 hours of a federal decision to deploy. The 12-hour “Push Packages” have been configured to be immediately loaded onto either trucks or commercial cargo aircraft for the most rapid transportation. Concurrent to SNS transport, the SNS Program will deploy its Technical Advisory Response Unit (TARU). The TARU staff will coordinate with state and local officials so that the SNS assets can be efficiently received and distributed upon arrival at the site.

The U.S. Department of Health and Human Services (HHS) will transfer authority for the SNS materiel to the state and local authorities once it arrives at the designated receiving and storage site. State and local authorities will then begin the breakdown of the 12-hour “Push Package” for distribution. SNS TARU members will remain on site in order to assist and advise state and local officials in putting the SNS assets to prompt and effective use. Transportation can play a critical role in ensuring the delivery, staging and dissemination of the SNS “Push Packages.”

Figure 2 provides an example of the issues involved in the distribution of medicine using the SNS. Appendices A and B provide additional information.

Modular Emergency Medical System: The MEMS concept is implemented at the local or regional level, and calls for the rapid organization of two types of expandable patient care modules, the Neighborhood Emergency Help Centers (NEHC) and the Acute Care Center (ACC). These two modules will aid in the triage of healthcare needs to support surge capacity issues that are likely to be encountered within communities. The mission of the NEHC is to direct casualties, especially non-critical and asymptomatic, potentially exposed patients, away from the hospitals, allowing them to continue to remain open in some capacity. In addition, the NEHC will render basic medical evaluation and triage while also providing limited treatment including the stabilization and distribution of prophylaxis, medication, self-help information, and instruction. An ACC is designed to treat patients who need inpatient treatment but do not require mechanical ventilation. Both the NEHC and ACC have associated transportation requirements that should be addressed in ESF#8 and the *Biological Incident Annex*.

Figure 3 provides an overview of MEMS. Appendix C provides additional information.

Transportation Biohazard Operational Concept

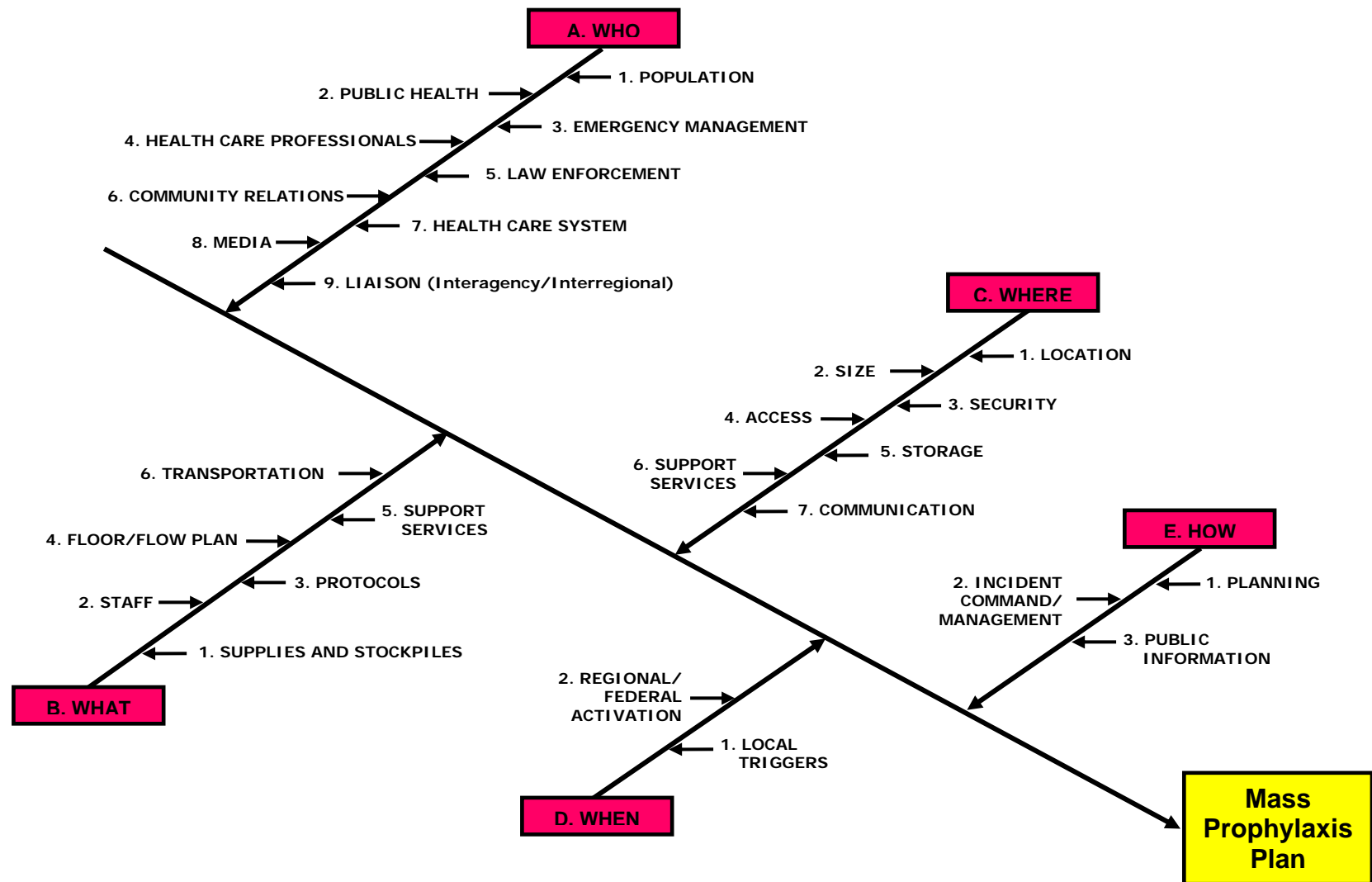


Figure 2: Mass Prophylaxis Plan for Distribution of Resources in the SNS

Transportation Biohazard Operational Concept

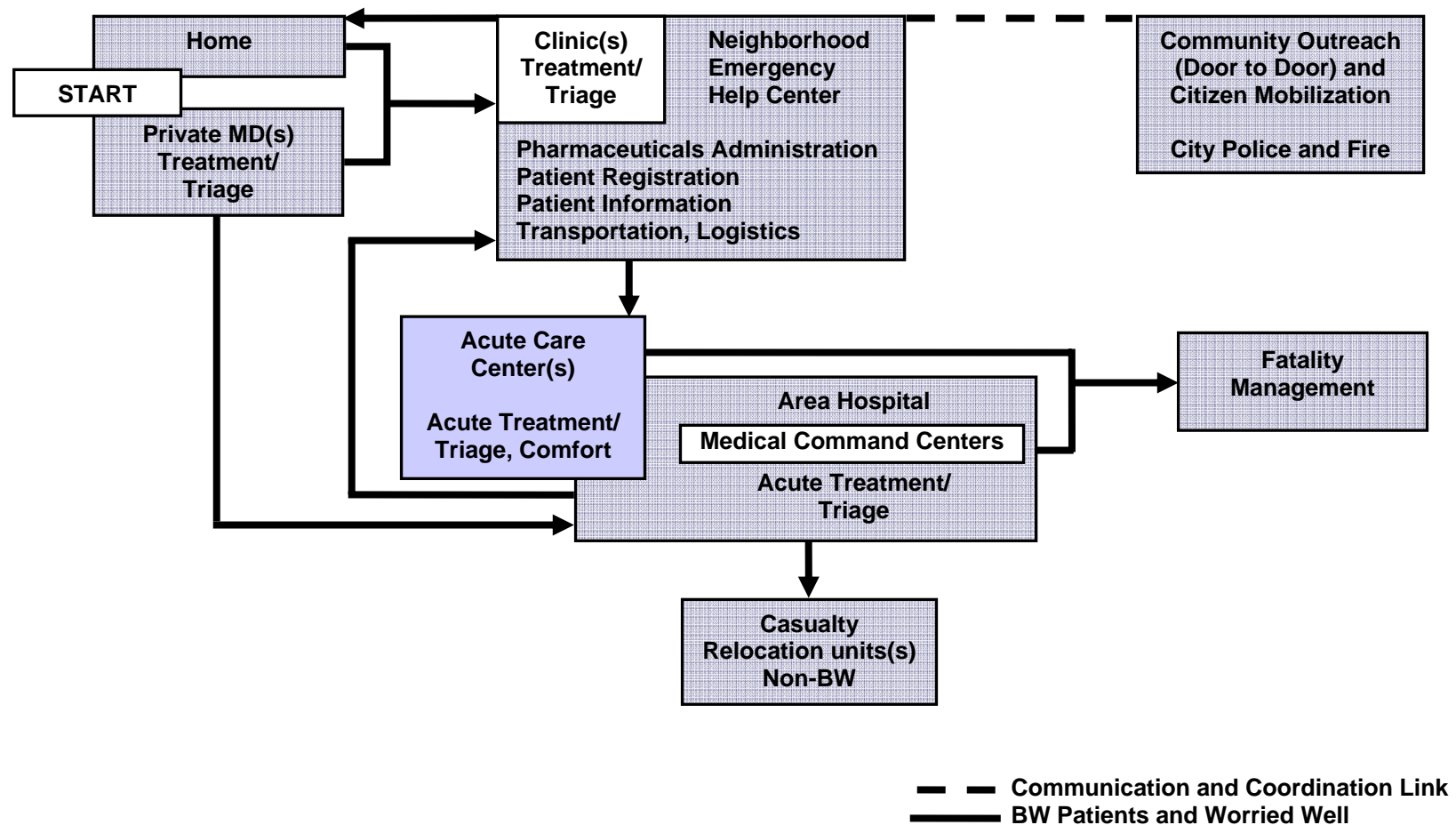


Figure 3: Modular Emergency Medical System

Transportation Biohazard Operational Concept

3.0 Background

This section of the Transportation Biohazard Operational Concept provides background on the types of events to be managed during biohazard emergencies. State DOTs may want to use some or all of the following information to develop this section of their operational concepts.

The United States has limited experience with emergencies caused by the intentional or accidental release of biohazard agents. However, research and thorough evaluation of those events which have occurred demonstrate that these emergencies present unique challenges for state DOTs.

Unlike most any other event, a biohazard emergency could simultaneously require **minimizing mobility** (preventing the movement of infected or potentially infected populations or preventing access to a contaminated area) **and maximizing mobility** (facilitating the rapid delivery of vaccines and supplies or maintaining mobility around a restricted area). Should such an event take place, delivery of these concurrent (and potentially conflicting) transportation strategies poses significantly different types of challenges to transportation decision-makers.

To address these challenges, this section of the operational concept provides background on both the nature of biohazard agents and key transportation considerations in addressing potential biohazard emergencies.

Biohazard Agents

A biohazard agent, as defined by the Centers for Disease Control and Prevention (CDC), is “an agent of biological origin that has the capacity to produce deleterious effects on humans, i.e., microorganisms, toxins and allergens derived from those organisms; and allergens and toxins derived from higher plants and animals.”

The term “bioagent” is used interchangeably with “biohazard” and can be associated with naturally occurring or intentional releases in the environment. As indicated in Figure 4, bioagents are typically of three main types: bacteria, viruses, and biological toxins.

Types of Biological Agents

Bacteria	Viruses	Toxins
<ul style="list-style-type: none">•Anthrax•Q-Fever•Tularemia•Psittacosis•Glanders•RMSF•Meliodosis•Brucellosis•Plague	<ul style="list-style-type: none">•Dengue Fever•Equine Encephalitis•Hantaan•Congo-Crimean HF•Chikungunya•Variola•Ebola•Smallpox	<ul style="list-style-type: none">•Botulinum•SEB•Perfringens•Ricin•Saxitoxin•Tetrodotoxin•Mycotoxins

Figure 4: Types of Biological Agents

Biohazards are often colorless, odorless, and are most easily spread undetected as an aerosol. They also can be spread through ingestion, injection, or direct contact.

Figure 5 provides more detail on the biological agents categorized by the CDC as the most serious. The CDC defines “Category A Diseases/Agents” as the most significant because they can be easily disseminated or transmitted from person to person; result in high mortality rates and have the potential for major public health impact; might cause public panic and social disruption; and require special action for public health preparedness. “Category B Diseases/Agents” are the second highest priority agents, and include those that: are moderately easy to disseminate; result in moderate morbidity rates and low mortality rates; and require specific enhancements of CDC’s diagnostic capacity and enhanced disease surveillance. “Category C Diseases/Agents” are the third highest priority agents, and include emerging pathogens that could be engineered for mass dissemination in the future.

Transportation Biohazard Operational Concept

Disease	Incubation Period	Symptoms	Spread (person to person)	Lethality if untreated	Persistence of Organism	Vaccine Status (as of March 2005)	Medical Treatment
HIGH THREAT AGENTS (CATEGORY a)							
Anthrax (Bacillus anthracis) (inhalational)	typically 1–6 days,	Fever, cough, profound sweats	No (only skin form spreads)	High (if inhaled) viable in soil >40 years	Very stable spores	Licensed	Antibiotics
Plague (Yersinia pestis)	1–7 days	Fever, cough, shortness of breath, (usually 2–3 days) sore lymph nodes	Moderate	High unless treated within 12-24 hours (pneumonic)	For up to 1 year in soil; 270-days in live tissue	Not current	Antibiotics
Tularemia (Francisella tularensis)	1–21 days (avg 3–6)	Fever, cough, pneumonia, headache	No	Moderate	For months in moist soil or other media	Not current	Antibiotics
Marburg (Viral hemorrhagic fever)	4–21 days	Sudden onset, fever, headache, followed by vomiting and diarrhea, rash, generalized bleeding in severe cases	Via fluids	>25% lethal	Relatively unstable	None	Supportive treatment only
Ebola (Viral hemorrhagic fever)	4–21 days	Sudden onset, fever, headache, followed by vomiting and diarrhea, rash, generalized bleeding in severe cases	Via fluids	50-80% lethal	Relatively unstable	Investigational	Supportive treatment only
Smallpox (Variola major virus)	7–17 days (avg 12)	Fever, aches, after 2–4 days rash appears	Moderate	High to moderate >30% lethal	Very stable	Licensed	Supportive
Botulism (Clostridium botulinum toxin)	12 hours–5 days	Muscle paralyzing illness	No	High without respiratory support	Stable for weeks in nonmoving food/water	Licensed (availability uncertain)	Antitoxin if administered quickly
LOWER THREAT AGENTS (SELECTED CATEGORY B AGENTS)							
Cholera (Vibrio cholerae)	4 hours–5 days	Sudden onset of voluminous (usually 2–3 days) watery diarrhea, vomiting, cramps, dehydration	Rare, although spreads rapidly via untreated water	Low with treatment, high without	Unstable in aerosols & fresh water, stable in salt water	Investigational	Antibiotics
Glanders (Burkholderia mallei)	1–14 days via aerosol	Pneumonia with or without blood poisoning, ulcers in nose, mouth, throat and lungs	No	Death in 7-10 days in blood poisoning form	Very stable	None	Antibiotics
Q fever (Coxiella burnetii)	7–41 days	Flu-like illness that can lead to pneumonia and hepatitis	No	Very low	For months on wood and sand	Not licensed in U.S.	Antibiotics
Encephalitis (Alphaviruses)	2–6 days	Fever, aches, pain behind the eye, nausea, vomiting	Low	Low	Relatively unstable	None	Supportive treatment
Ricin (Ricinus communis)	18–24 hours	Can shut down organ function	No	High (injected)	Stable supportive treatment	Investigational	No antidote
* Incubation periods listed are for naturally occurring outbreaks, which could differ for agents used as weapons. Data for incubation period, lethality, and persistency from U.S. Army Medical Research Institute of Infectious Diseases Blue Book, August 2004.							

Figure 5: Disease/Agent Characteristics

Transportation Biohazard Operational Concept

3.0 Background – cont.

Types of Biohazard Events

Transportation agencies are most concerned about four broad categories of biohazard events:

- deliberate release directed at humans,
- agroterrorism,
- accidental release, and
- natural occurrence.

Each of these is discussed below.

Deliberate Release

A deliberate release of a biohazard directed at humans is generally recognized to be the type of biohazard event that poses the greatest risk to human health and national security. Such an event could be overt (immediately recognized) or covert (unrecognized at the time of release).

An overt biohazard event might be identified by the following: previous intelligence; a threat of action or post-event claim of responsibility, and direct evidence, such as powder residue or equipment used to release the bioagent, gathered at the release site. The response in an overt situation could be immediate, increasing the chances of limiting those exposed. First responders would be those traditionally involved in an emergency – police, firefighters, and Emergency Medical Services (EMS) personnel.

In a covert attack, there is often no forewarning, making the prediction of when and how an attack might occur impossible. Due to the delayed onset of most diseases caused by bioagents, there might be no indication of intentional release until days or even weeks after it occurred. Exposed individuals likely would begin to report generic symptoms accompanied by a fever to healthcare personnel at local hospital and medical centers.

For a deliberate attack on people, biological agents could be disseminated in one or more of the following ways:

- **Aerosol dissemination** is the dispersal of an agent in air from sprayers or other devices. An aerosol attack might take place outdoors in a populated area or indoors, e.g., in the ventilation system of a building, in the subway, on planes.
- **Food or water**, especially ready-to-eat food (vegetables, salad bars) could be intentionally contaminated with pathogens or toxins. The water supply is less vulnerable because dilution, filtration, and the addition of chlorine can kill most disease-causing organisms.
- **Human carriers** could spread transmissible agents by coughing, through body fluids, or by contaminating surfaces. Most agents would make people ill or incapacitated before they become highly contagious, thereby reducing transmission of the disease.
- **Infected animals** can cause people to become ill through contact with the animals or contaminated animal products.
- **Insects** naturally spread some agents such as plague bacteria (vector borne illnesses) and potentially could be used in an attack.
- **Physically distributed** through the U.S. mail or other means.

Agroterrorism

Agroterrorism describes the deliberate introduction of an animal or plant disease with the goal of generating fear, causing economic losses, and/or undermining stability. The results of this type of attack can include major economic crises, loss of confidence in food supplies and government protections, and possibly human casualties. Agricultural biohazard agents (e.g., foot and mouth disease, avian influenza, soy bean rust, etc.) do not have to be aerosolized to be effectively disseminated. The introduction of an infected plant or animal or its fluids could spread disease through the rest of the crop or livestock.

Transportation Biohazard Operational Concept

3.0 Background – cont.

Accidental Release

An accidental release of biohazards could occur by mishandling of biomedical waste or an accident associated with a laboratory that studies contagious diseases or biological threats. These releases may involve accidents during transportation of waste material, damage to laboratory facilities where diseases are studied, or accidental release of laboratory animals infected with diseases. A recent example of a lab-related accidental release occurred last year when three lab workers at a Boston University research facility contracted tularemia after being exposed to the virus through their research. The public was not informed of the accidental release until three months after tularemia was confirmed as the infectious source.

Some accidental releases have been tied to military bioweapons programs. For example, an ecological research ship passed within nine miles of a smallpox testing site off the coast of the former Soviet Union in 1971. A single crew member became infected, presumably through inhalation of the disease, and carried the virus back to port. The Soviet government has never admitted to aerial smallpox testing; however, a 2002 report prepared by the Monterey Institute of International Studies suggests that an outbreak ensued, killing three people and infecting many, some of whom had been previously vaccinated. Hundreds were quarantined, and nearly 50,000 were vaccinated in response to the release. Travel to and from the port city was banned.

Despite the public hazards of an accidental release of a bioagent, the public health impact is likely to be less severe than for a deliberate release.

Accidental releases can also affect agriculture, contaminating livestock, crops and processed food.

Natural Occurrence

Bacteria, viruses, and biological toxins that are harmful to humans and animals frequently spread naturally through populations. When large populations are affected or biological responses are sufficiently severe, naturally occurring biohazard events can cause a major public health problem. Widespread natural outbreaks occur for a number of reasons, including the following:

- Natural mutations that make diseases resistant to existing vaccines or naturally occurring antibodies,
- Environmental conditions that favor the development of certain bioagents, and
- Natural cycles of disease agents.

Another naturally occurring biohazard source is the mishandling and improper sanitation of food and water. In the case of food, a single source such as a restaurant that fails to thoroughly cook its meat could cause a localized threat to public health. Contaminated food could also originate from a single feedlot or a cattle-dense region that distributes animal products across the country, potentially resulting in numerous, scattered outbreaks. Leaking septic systems or deficient water sanitation systems could cause water contamination, leading to localized biohazard events.

Overt biological attacks could be confused with naturally occurring outbreaks, especially in food-borne diseases and those spread by animals. The detection and identification process would be the same as described above for a deliberate release. However, in the event of a natural occurrence, the public health impact is likely to be less severe than for a deliberate release.

Modal Characteristics

State DOTs are typically responsible for multiple modes of transportation. Each mode has specific characteristics that affect its potential role in the release and spread of biohazards. These characteristics include the physical characteristics of the system and the way the system typically is used. The most important characteristics relate to the degree to which the system concentrates people, the distance and speed of travel, and mechanisms for controlled access.

Transportation Biohazard Operational Concept

3.0 Background – cont.

The vulnerabilities of different modes supported and/or operated by state DOTs are presented in Figure 6.

Events of Greatest Concern

Based on the vulnerabilities identified in Figure 6, the biological agents of greatest concern to transportation network are:

- Airborne non-communicable threats such as anthrax, tularemia, and viral hemorrhagic fevers.
- Airborne communicable threats such as smallpox, plague, and bioengineered influenza.
- Introduction of infectious animal or plant diseases or viruses in shipped livestock and goods, e.g. BSE (Mad Cow disease, Foot and Mouth disease, etc.).

In addressing these threats, preparedness and response must be coordinated at all levels – local, state, and federal – to mitigate the effects of bioagents, to prevent morbidity and mortality, and to implement recovery operations.

During a biohazard event, the state DOT will be a supporting player, providing resources and services to state and local public health agencies, as well as hospitals and members of the outpatient medical community. These agencies will provide the initial detection and public health response. At the first suspicion of an intentional release of a disease-causing microbe or toxin, law enforcement agencies will be alerted.

The law enforcement function during a biohazard event will play a critical role in maintaining order and reducing panic among affected and potentially affected populations. State DOTs will coordinate with their partners in law enforcement and the National Guard to support activities that may be implemented to protect public health.

Biological Vulnerabilities	Highway	Transit	Aviation	Rail	Maritime
Enclosed Space	Passenger compartments and Tunnels	Passenger compartments, Tunnels, Stations and Terminals	Aircraft and Airport terminals	Railcars And Tunnels	Cruise ships
Potential for Persistent Contamination	Low	High for Stations and Passenger compartments	High for Airports and Aircraft	High for Stations, Passenger trains	High for Cruise ships, Terminals
Difficulty of Decontamination	Medium	High	High	Medium	Medium
Re-suspension of Deposited Contamination	High	High	High	High	Low
HVAC Spread Contamination	Traffic Management Centers, tunnels and rest stops	Within Passenger compartments, Terminals	Within Airports, Aircraft	Within Passenger car, Station	Cruise ship, Passenger terminals
Drinking Water Contamination	None	Passenger drinking water	Passenger drinking water	Passenger drinking water	Passenger drinking water
Ability to Contaminate Other Modes	Yes	Yes	Yes (Airports)	Yes	Yes (Docks)
Agricultural Cargo Contamination	Yes	No	No	Yes	Yes
Transport Pathway Contamination	Yes (Roads)	Yes (Transit routes)	Yes (Airports)	Yes (Tracks)	Yes (Docks, Harbors, Canals, Rivers)

Figure 6: Modal Vulnerabilities to Biohazard Agents

Transportation Biohazard Operational Concept

3.0 Background – cont.

Transportation Impacts of Public Health Response

To manage the public health impacts of a biohazard situation, the state DOT understands that the local and state public health, public safety, and emergency management communities have identified a set of activities that they would perform to identify, manage and resolve an outbreak resulting from a biohazard agent. In addition, the public health and agriculture/veterinary medicine communities have obtained legal and civil authorities for protecting public welfare, specified in state and local statutes. Using these authorities, local and state officials may:

- **Isolate Symptomatic Individuals.** In general, isolation refers to the separation of persons who have a specific infectious illness from those who are healthy and the restriction of their movement to stop the spread of that illness. Isolation is a standard procedure used in hospitals today for patients with tuberculosis and certain other infectious diseases.
- **Implement Social Distancing.** A relatively new approach to stemming the spread of communicable disease, social distancing imposes voluntary and mandatory restrictions on movement within a given geographic area. For example, an affected community may implement “snow emergency” conditions, canceling work, social events, and closing businesses, and encouraging citizens to remain in their homes.
- **Order Quarantine.** Generally refers to the separation and restriction of movement of persons who, while not yet ill, have been exposed to an infectious agent and therefore may become infectious. Quarantine is intended to stop the spread of infectious disease by preventing access to/egress from a specific area that may contain individuals who have been exposed.

- **Confiscate and Destroy Property.** Material, plants, animals, facilities and other goods that have been determined to be harmful to human health can be confiscated and destroyed.
- **Issue Universal Prescription Orders.** These orders reduce the time required to dispense prophylaxis and vaccines to affected or potentially affected persons by providing a universal prescription for their use among citizens in a specific locality or state.
- **Designate Vaccination and Prophylaxis Dispensing Facilities.** Using these authorities, state and local agencies may authorize specific facilities or elements of a Modular Medical Emergency System to dispense medicine to affected persons, freeing hospitals and other medical facilities to deal with symptomatic patients.

Public health strategies for isolation, quarantine and the confiscation and destruction of property may be conducted on a voluntary basis or be compelled on a mandatory basis through legal authority. When using state or local authorities, these public health strategies are typically issued as court orders or warrants and are carried out by the appropriate law enforcement agency. Both isolation and quarantine can require confinement to an individual's home, a hospital, a medical center, or another facility designated by local, state or federal officials. In hazardous conditions, law enforcement officers and medical personnel are required to use appropriate personal protective gear when issuing isolation or quarantine orders. Depending on the nature of biohazard situation, these personnel may also receive vaccines.

In addition, in order to prevent the interstate spread of disease, the U.S. Department of Health and Human Services may take appropriate federal actions using the authorities granted by U.S.C. title 42, 42 CFR parts 70 and 71, and 21 CFR 1240. State, local, and tribal assistance with the implementation and enforcement of isolation and/or quarantine actions is utilized if federal authorities are invoked. The U.S. Department of Agriculture has similar authorities related to the inspection, confiscation and destruction of food and animal products. Animals and farms can also be subject to legal authorities involving isolation and quarantine.

Transportation Biohazard Operational Concept

3.0 Background – cont.

Use of these strategies has significant implications for the transportation system, and could result in any of the following situations:

- Voluntary and enforced travel restrictions for an affected area or from an affected area.
- “Snow day” conditions, including suspension of work, schools, and public gatherings in an affected community.
- Closures of highways, passenger transportation systems, arterials, bridges, tunnels, turnpikes and toll roads and re-routing of all area-wide traffic around affected area.
- Modal shifts and/or re-routing of freight transportation around affected area.
- Creation of *ad hoc* transportation systems to support movement of prophylaxis, other medical supplies, equipment, food and water, and medical and public safety personnel to specified locations near or within an affected area.
- Creation of *ad hoc* transportation systems to support the movement of potentially affected persons to centers for medical evaluation, vaccination and prophylaxis.
- Enforced curfews/quarantines in affected areas, with access and egress controlled through barricades and checkpoints.
- Creation of *ad hoc* transportation system to support a Modular Emergency Medical System established within an affected area.

These activities may be coordinated with not only state and local law enforcement and public health, but also with the National Guard. Other state and federal medical response teams may also be used, such as the Disaster Medical Assistance Teams (DMAT) and the Disaster Mortuary Operational Response Teams (DMORT). Activation of the National Disaster Medical System (NDMS) under the auspices of the U.S. Public Health Service may be required.

The potential introduction of biohazards into livestock and crops is managed by local, county, state and federal departments of agriculture and veterinary medicine and other federal agencies with responsibility for regulating the import and trade of livestock, plants and agricultural goods. Existing detection and surveillance programs, inspections, research and training support the safety of livestock and foods.

There are several response options in the event of contamination, ranging from isolation of affected livestock and crops, to vaccination of livestock, to quarantines established around affected farms, facilities or production centers. In the event of quarantine, typically the depopulation and destruction of livestock and crops is required, along with indemnity payments to farmers, and immediate suspension of trade.

Implications for the transportation system may include:

- Support for restricted access to farms, facilities and processing centers.
- Support for decontamination of affected facilities, vehicles and locations.
- Support for shipping/disposal of biohazard waste materials.
- Inspections, advisories and enforcement to prevent movement of contaminated livestock/food products.
- Public information and rumor control.
- On-going coordination with motor carriers and railroads, public health agencies, and agricultural officials.
- Mode shifts or restrictions (if needed).

Additional support may be obtained in managing these situations from enforcement personnel within local, state and federal departments of agriculture, as well as the Veterinary Medical Assistance Teams (VMAT) and the Regional Emergency Animal Disease Eradication Organization (READEO) under the auspices of the U.S. Department of Agriculture.

Transportation Biohazard Operational Concept

4.0 Transportation Authorities

This section of the Transportation Biohazard Operational Concept should identify state DOT authorities in supporting response to a biohazard event. Authorities should be specified, including references to state codes, enabling legislation, or other statutes.

In developing this section, state DOTs may want to consider two types of authorities: emergency and other.

Emergency authorities may include:

- Closure and re-opening of transportation facilities, services and equipment.
- Coordination of travel restrictions into/out of the state or an affected area within the state.
- Coordination of traffic and access control points, barricades, and checkpoints to control traffic into/out of an affected area or location.
- Issuance of highway clearances, permits, and waivers for equipment, personnel, and contaminated materials (to support removal of carcasses, contaminated plant matter and foodstuffs, etc.).
- Coordination of and support for emergency evacuation and population re-location, including contra-flow operations, public transit systems, and the management of pedestrians on roadways.
- Coordination of transportation for victims to support mass casualty management and care operations.
- Delivery support for medicine, medical supplies, and medical personnel related to the Strategic National Stockpile and/or other mass prophylaxis sources.
- Coordination of transportation services to bring “worried well” and potentially affected persons to vaccination and prophylaxis dispensing sites, Neighborhood Emergency Help Centers, or other locations.

- Coordination of transportation services for special populations, including persons with disabilities, incarcerated persons, children in daycare centers and schools, the elderly, and those who may be ill or infirm (not related to the biohazard situation).
- Emergency procurement, including equipment and services necessary to support implementation of public health strategies, removal of contaminated materials, and decontamination of transportation facilities and equipment.
- Coordination of refrigerated vehicles and facilities to support medical and/or mortuary operations.
- Damage assessment (from contamination, lost revenue, etc.) and specialized engineering services.
- Hazardous Materials clean-up and decontamination.

Other authorities may include:

- Traffic monitoring.
- Traffic routing, diversion and detours.
- Freight management, including interstate and intrastate commerce, through coordination with commercial motor vehicle carriers, pipelines, airports, ports, railroads, and freight and transportation logistics associations.
- Authorities or responsibilities specified in mutual aid agreements.
- Authorities or responsibilities specified in agreements with public works and utilities agencies and companies.
- Authorities or responsibilities specified Memorandum of Agreement/Understanding with state and local emergency responders.
- Support provided for maintaining passenger transportation systems or creating *ad hoc* systems to serve specific functions.
- Public information.

Transportation Biohazard Operational Concept

5.0 Planning Situations and Assumptions

This section of the Transportation Biohazard Concept of Operations describes the planning situations and assumptions used by the state DOT in establishing its biohazard response capabilities. In developing this section, the state DOT may wish to incorporate some or all of the following situations and assumptions:

- A disease outbreak of exceptional nature could occur affecting the citizens served by the state DOT transportation network.
- Contamination of livestock and/or agricultural food products or water supply could occur, disrupting the supply and movement of these products and threatening the lives and well-being of citizens served by the transportation network.
- The transportation network could function to spread a deliberately released biological agent or could be a target of a deliberate release.
- Deliberate releases involving the transportation network may or may not be detected at the time of release.
- Overt releases may be announced in written, telephone or email/website communications or they may be observed by transportation personnel.
 - Transportation personnel are trained in recognizing suspicious packages, conditions, behavior and equipment on transportation property.
 - Procedures have been developed for reporting and investigating suspicious packages, conditions, behavior and equipment and making notification to local emergency response agencies.
- Covert releases most likely will not be identified until symptoms begin presenting in affected individuals and they are examined and treated by the medical community.
- The state DOT will rely on local, state and federal resources to identify biological agents and develop treatment and decontamination protocols, and to develop emergency response plans within appropriate local, state and federal authorities.
- The state DOT will support these plans and actions through activation of existing transportation plans, mutual aid agreements, and by making requests to other transportation systems and agencies.
- In the event the state DOT is overwhelmed (through absenteeism or sick employees), it may implement its Continuity of Operations plan.
 - Notification of the activation of the Continuity of Operations plan will be given to the appropriate local/regional/state agencies.
 - Minimum essential functions will still be performed.
- Other situations may emerge in which state DOT employees or organizational elements are located within areas of restricted mobility or quarantine. In these situations, transportation employees may be able to support services within the restricted area.
- Based on current capabilities, local jurisdictions within the state's transportation network anticipate that, at a minimum, support will be required from mutual aid partners and the state for reception and movement of medical supplies, equipment and personnel. State DOT support may be requested to aid in the movement and distribution of these resources.
- Local jurisdictions within the state's transportation network assume that the Strategic National Stockpile (SNS) will be available through requests and will be delivered through a strategy established by the affected jurisdiction in coordination with appropriate state and federal officials.

Transportation Biohazard Operational Concept

5.0 Planning Situations and Assumptions – cont.

- The state DOT will be available to support transportation and distribution of SNS resources, as specified in the terms of cooperative agreements established with the U.S. Department of Health and Human Services and other state and local agencies.
- Based on current capabilities, local jurisdictions within the state's transportation network also anticipate that support will be required for traffic control, logistics, law enforcement, crowd control, and other activities associated with implementation of certain public health strategies that restrict or limit mobility. State DOT support may be requested for these functions.
- Local jurisdictions within the state's transportation network assume that disease surveillance will provide information such as trends, patient presentations, signs and symptoms, lab results and clinical diagnoses that will be critical to an effective response. Based on the results of this surveillance, the state DOT will provide information and support to manage transportation in and around any affected areas.
- Figure 7 (on the next page) identifies the basic response activities to be performed in response to a biohazard event. For the most part, these activities are managed by local/regional/state public health agencies and local/state law enforcement.
- Figure 8 (in the right-hand column) identifies whether transportation support may be required to perform these basic response activities.
- Below, a brief discussion is provided for each response activity to illustrate how the state DOT may coordinate with local, regional and state public health, law enforcement and emergency management authorities to support these activities within its available resources.

Response Activity	Transportation Support
Medical Surveillance	Possible
Medical Diagnosis	No
Epidemiological Investigation	Possible
Criminal Investigation	Possible
Activation of Mass Prophylaxis Request/Distribution Plan	Likely
Residual Hazard Assessment and Mitigation	Possible
Control of Affected Area/Population	Likely
Care of Casualties	Likely
Emergency Management Operations	Likely
Fatality Management	Possible
Resource and Logistic Support	Likely
Continuity of Infrastructure	Possible
Family Support Services	No

Figure 8: Transportation Support Required for Public Health Response Activities

Transportation Biohazard Operational Concept

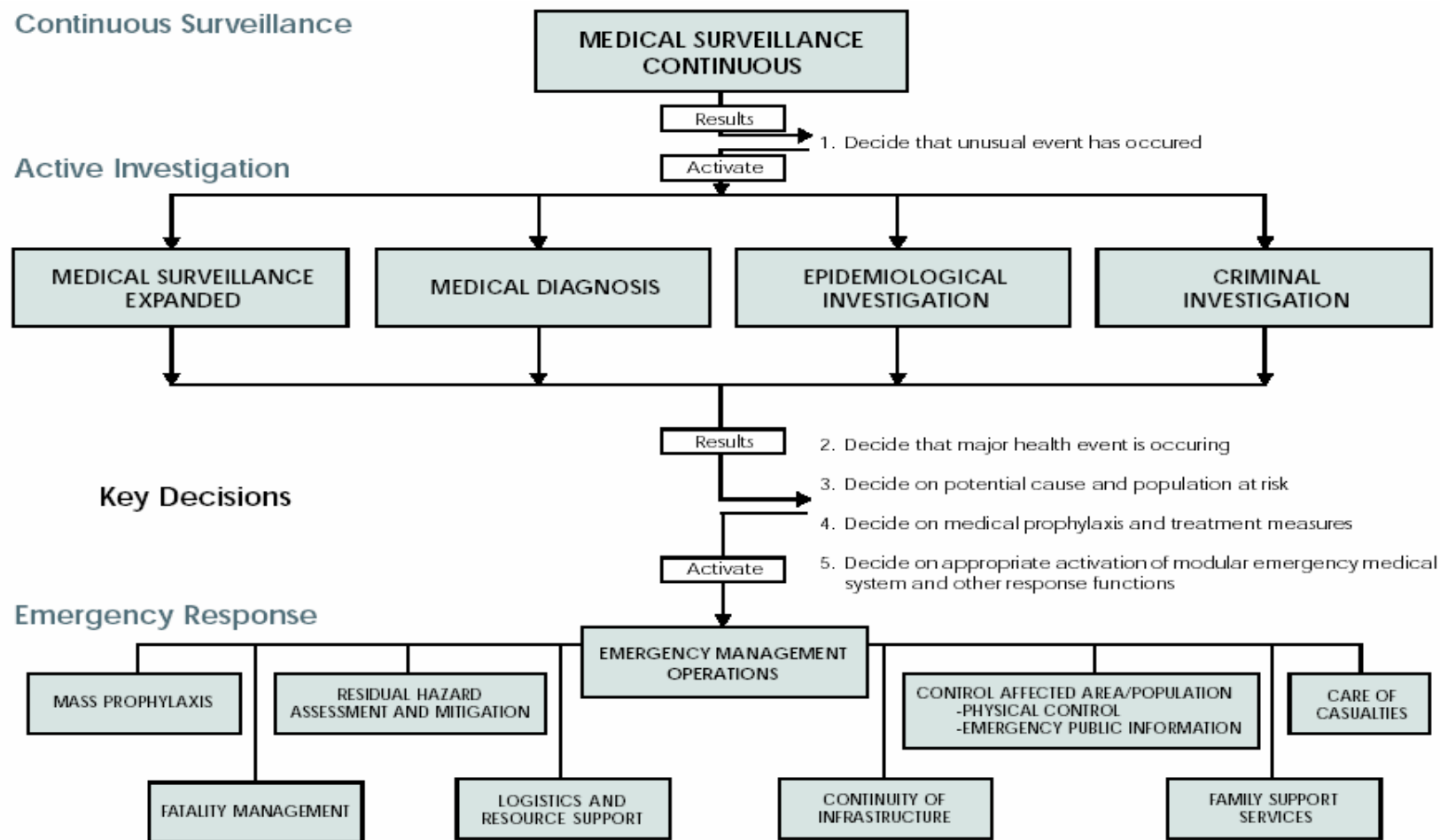


Figure 7: Public Health Response to Biohazard Events

Transportation Biohazard Operational Concept

5.0 Planning Situations and Assumptions – cont.

In providing support for a biohazard emergency, the state DOT assumes the following:

- **Medical surveillance** needs to operate continuously and provide non-specific detection of medical activities above established baselines in order to improve the chances of detecting unusual medical events sooner rather than later. Transportation agencies may identify suspicious substances or conditions, or experience unexplained illnesses among employees, that should be reported to appropriate law enforcement and/or public health officials.
- **Preliminary medical diagnosis** would be undertaken locally with samples sent to the Centers for Disease Control and Prevention, U.S. Army Medical Research Institute of Infectious Diseases, or other state, or local specialty laboratories for identification and confirmation. Transportation has no role in this function.
- **Epidemiological investigation** would include interviews and diagnoses to determine the distribution of medical cases. Since transportation can be the target or vector in a biohazard release, the state DOT will provide resources and personnel to support investigation, inspection, testing, and evaluation as needed. Transportation also has access to freight management information systems to support tracking of potentially contaminated goods or vehicles. Finally, transportation personnel will ensure safe access for medical investigators to transportation facilities and equipment.
- **Criminal investigation**, in addition to meeting the law enforcement needs in the event of an intentional release, could complement the epidemiological investigation. The results of these multiple investigations would be utilized by local officials to first assess whether a major health event is occurring, and then to help determine the potential cause and identify the population at risk. Transportation will support these investigations as needed.
- **Medical prophylaxis** involves the distribution and medical application of appropriate antibiotics, vaccines, or other medications in order to prevent disease and death in exposed victims. Because of uncertainties as to who was exposed, treatment may be applied to a much greater number of people than those actually exposed and may even be given to the entire city population. Transportation will be required to obtain, store, and move medical equipment and medicine, perhaps requiring refrigerated vehicles. This is particularly likely if a request is made for medicines from the Strategic National Stockpile. The state DOT will support/coordinate this function as needed and as specified in the terms of cooperative and mutual aid agreements among local, state and federal agencies.
- **Residual hazard assessment and mitigation** encompasses a set of activities that would assess and protect the population from further exposure to the biohazard agent. The risks from residuals are small compared to the prime attack but may still warrant attention. Assessment and mitigation can include environmental sampling, decontamination, and insect and animal control measures as applicable. State DOTs will support this activity through the provision of traffic control (at a specific location), traffic and freight information, access to available hazardous materials clean-up contractors, engineering support (if needed) and management of clearances and waivers for the shipment of contaminated materials.

Transportation Biohazard Operational Concept

5.0 Planning Situations and Assumptions – cont.

- **Control of affected area and population** is divided into two major sub-elements: physical control and public information and rumor control. Physical control would provide crowd control and security at hospitals, emergency medical facilities, fatality handling sites, and other vital installations such as airports, utility sites, bridges, and tunnels, as well as patrol of affected areas to maintain security. Physical control would extend to enforcing isolation and quarantine orders and supporting social distancing strategies. Public information and rumor control would inform and instruct the population in ways that enhance emergency response and avoid panic. Particular attention would be needed to provide reliable information and subject matter experts to the media to avoid panic and the need for media to find their own “experts” who may provide inaccurate or sensationalized information. State DOTs will support this activity through coordinating the provision of vehicles, barricades, traffic control devices, personnel, traffic information, traffic management services, and transportation public information systems. Facilities, services or equipment may need to be closed. In the event that the National Guard or other agencies require clearances or waivers for vehicles, the state DOT will provide them. Depending on the location of the affected area, the state DOT may have/be able to provide on-going aerial and video surveillance to law enforcement agencies. Mobility restriction for an affected area could also require significant re-routing of traffic around the affected area to ensure the on-going mobility for freight transportation. Affected areas will also require supplying – for food, water and other items. State DOTs will coordinate with state and local agencies to ensure that access routes are available for these critical resources.
- **Control and operation of the Modular Emergency Medical System**, along with medical prophylaxis, forms the backbone of effective response to a biohazard emergency. To cope with potentially high numbers casualties and those that think they are casualties (the worried well) the Modular Emergency Medical System may be established. Under this concept, public and private area hospitals would admit casualties until they approach full capacity while operating under their internal emergency operations plans. Existing clinics would be expanded into neighborhood emergency help centers (NEHC) to provide the primary point of entry into the emergency medical system for biohazard patients and the worried well. These centers would provide triage and distribute medical prophylaxis, medications, and self-help information. A community outreach function would be performed by law enforcement, firefighters, community health personnel, and other officials to link home-bound patients to these centers. Community outreach personnel would provide limited medical care by mobilizing citizen home care efforts and would assist in quickly distributing medical prophylaxis and self- help information. Acute care centers (ACC) would be established in structures close to the area hospitals to provide definitive and supportive care for acutely ill patients that exceed hospital capacity. Hospital patients not affected by the biohazard situation and that were not in a critical condition could be moved to other hospitals outside of the impacted area in order to provide additional hospital space for biohazard patients. The state DOT appreciates the critical mission performed by the Modular Emergency Medical System during a biohazard emergency. The state DOT will provide/coordinate transportation resources to support this system, including vehicles, traffic information, traffic management services, traffic control devices, signage and public information.

Transportation Biohazard Operational Concept

5.0 Planning Situations and Assumptions – cont.

- When state or local officials decide that a major health event is occurring, they will activate **command, coordinating and public information systems** through the implementation of NIMS requirements for the Incident Command System/Unified Command/Area Command in the field; state and local Emergency Operations Centers (EOCs) to coordinate resources and strategies among and between levels of government; and an integrated public information system to ensure a consistent message to the public and media. Within this structure, a unified medical branch will be established, and representatives from local, state, and federal agencies will be requested at the local and state EOCs. The state DOT has developed an Incident Management System compliant with NIMS to integrate effectively into field response led by public health and public safety responders. The state DOT will assign representatives to the appropriate local and state EOCs, and will also coordinate with these EOCs from the State Transportation Emergency Operations Center.
- **Resource and logistic support** will ensure that mobilization centers and distribution points are established for incoming supplies. In most cases, a central reception center would receive incoming State and Federal support personnel and provide instructions, accreditation and assignments. This process will follow the procedures specified in the local and state Emergency Operations Plans and in the National Response Plan. In a major biohazard emergency, it is likely that most, if not all, 15 of the Emergency Support Functions under the National Response Plan would be activated. The state DOT will perform its resource and logistic support functions as designated in these plans.
- **Fatality management** includes the conversion of local or regional morgues to provide rapid central processing of remains and the establishment of long-term storage facilities using refrigerated containers to hold remains for final disposition. State DOTs will support this function through coordinating the provision of vehicles, facilities and clearances/waivers to move contaminated remains.
- **Continuity of infrastructure** may be necessary to activate local continuity of operations plans when disaster-related absenteeism exceeded critical thresholds. The state DOT has developed a continuity of operations capability and plan, and has identified minimum functions to be performed, lines of succession, delegations of emergency authority, alternate facilities, and procedures for communicating with employees, supporting critical transportation systems, and protecting critical records and information.
- **Family support services** would provide information hotlines and implement central coordination of volunteer service organizations. Due to the confidential nature of this activity, it is unlikely that state DOTs would play much of a role.

Transportation Biohazard Operational Concept

6.0 Transportation Role in Biohazard Event

This section of the Transportation Biohazard Operational Concept identifies the activities that may be performed by the state DOT in response to a biohazard emergency. State DOTs may want to use some or all of the following information in developing this section for their operational concepts.

This section presents the activities to be performed by the state DOT during a biohazard emergency. Standard phases of emergency management are used to guide transportation activities for a biohazard event. These phases include:

- Awareness
- Prevention
- Preparedness
- Response
- Recovery

Awareness

Activities performed by the state DOT to ensure awareness regarding biohazard events include the following:

- Maintaining access to/participating in local/regional/state threat warning systems.
- Build relationships with local, regional, and State Emergency Management Agencies (EMAs), Emergency Operations Center (EOC) managers and personnel, and Local Emergency Planning Committees (LEPCs) and State Emergency Response Commissions (SERCs).
 - Will enhance their understanding of the transportation agency and the agency's ability to provide supporting services.
- Participating in local/regional/state joint terrorism task forces and other preparedness organizations.

- Establishing direct electronic connectivity to local/county and regional/state 911 Centers and Emergency Operations Centers.
- Building relationships with local and state law enforcement.
- Building relationships with local and state departments of public health and agriculture/veterinary medicine.
- Obtaining security clearances for key leadership positions.
- Establishing protocols for employee/contractor notification and reporting of threatened/suspicious/actual biohazard events.
- Establishing protocols for heightened Homeland Security Advisory System threat levels.
- Build relationships with the U.S. military and intelligence communities.

Prevention

Activities performed by the state DOT to address prevention regarding biohazard events include the following:

- Training employees to support transportation biohazard event detection and verification in transportation facilities (i.e., suspicious conditions, packages, behavior and equipment).
- Implementing protocols for heightened Homeland Security Advisory System threat levels.
- Deploying detection and surveillance technology.
- Coordinating with law enforcement during periods of heightened threat levels.
- Distributing bulletins and special orders to employees regarding threat levels/conditions.
- Addressing security in special events planning and coordination.
- Developing plans for the pre-deployment of resources.

Transportation Biohazard Operational Concept

6.0 Transportation Role in Biohazard Event – cont.

- Perform “all hazards” mitigation activities to address natural disasters and other potential emergencies:
 - Land use and management
 - Engineering assessments
 - Development and adherence to local and state codes and federal regulations
 - Application of special materials and designs to prevent flooding
 - Control wildfires
 - Reduce the impacts of earthquakes, hurricanes and tsunamis, etc.
- Perform threat and vulnerability assessment
- Security reviews performed on plans, designs, blueprints and specifications.
- Use of CCTV video recording and archival considerations
- Perform specific training, equipment procurement or other activities designed to focus on prevention by employees.

Preparedness

Activities performed by the state DOT to ensure preparedness for biohazard events include the following:

- Developing plans and procedures:
 - Transportation Emergency Operations Plan, supporting plans and procedures.
 - Transportation Incident Management System.
 - Memorandum of Understanding/Agreement with other local and state agencies.
 - Mutual Aid Agreements and notification/information sharing protocols with local/regional and state partners.
 - Continuity of Operations Plan.
 - Operational Concepts for Emergency

Transportation Operations and Biohazard Events.

- Coordinating with local/regional and state agencies regarding the development of local/regional and state Emergency Operations Plans and Annexes.
 - Establishing expectations regarding transportation functions during a range of potential biohazard scenarios.
- Coordinating with local/regional and state agencies to address the needs of special populations during biohazard events (disabled, elderly, school children, and inmates).
- Coordinating with contractors to identify resources they may have available to support emergency response, and to ensure their willingness to use them during an emergency.
- Establishing employee and contractor training and exercise programs.
- Participating in joint multi-agency training and exercises.
- Establishing emergency response capabilities:
 - Developing 24/7 event notification protocols.
 - Developing extended/emergency staffing plans, including the suspension of vacation and leave.
 - Developing call trees/employee notification systems.
 - Developing employee emergency communications systems.
 - Preparing employee communication strategy and materials for distribution in advance of an actual biohazard event.
 - Developing single-point-of-contact notification systems for contractors and work zones.
 - Developing communication capabilities with other local, regional, and state response agencies.
- IT/GIS continuity of operations capabilities
- Employing the use of transportation CCTV and aerial surveillance policies to ensure that situations observed by transportation personnel are relayed effectively to appropriate responders.

Transportation Biohazard Operational Concept

6.0 Transportation Role in Biohazard Event – cont.

- Establishing an up-to-date inventory of transportation resources, accessible from multiple locations, and shared, as appropriate with local/state emergency management agencies and other organizations.
- Addressing biohazard waste removal, transportation and disposal in programs and contracts for hazardous materials clean-up programs.
- Coordinating with local, state and federal agencies to identify decontamination requirements and standards for vehicles that may need to be re-used quickly in the field. Also, investigate longer-term decontamination requirements for enclosed facilities, outdoor areas, and other transportation equipment.
- Establishing transportation decontamination and recertification protocols for vehicles used to support field operations.
- Coordinating with interagency working groups or other organizations established to address decontamination issues in local, regional and state communities
- Engaging foreign language speakers to special populations and address the need for plans and procedures to communicate with citizens who may not understand English.

Technology

- During a biohazard event, the state DOT is committed to using deployed technology to support its mission:
 - Signal and ramp controls.
 - CCTV and traffic monitoring capabilities.
 - Variable message signs.
 - Phone and Internet-based traveler information systems.

- Emergency Operations Centers (EOCs) that coordinate a wide range of operations equipment (e.g., integration of signals, cameras, radios, web sites, HOV/Managed lanes, message signs, and highway advisory radio).
- GIS technology
- CAD integration technology

Response

Activities performed by the state DOT to respond to biohazard events include the following:

Notification

- Receiving notifications from activated elements of the local/regional/state response structure.
- Classifying the biohazard situation using the transportation agency's Emergency Activation Levels.
- Making appropriate notifications to transportation personnel based on the Emergency Activation Level and requests from activated public health, emergency management, and public safety responders.
- Notification to/activation of the state DOT Emergency Operations Center.

Coordination

- Assigning personnel to local/regional and state Emergency Operations Center(s) to coordinate with and assist other agencies.
- Providing situation assessment regarding the status of the transportation network, including real-time traffic data and traffic reports for roads within the affected area or on roads leading into/from the area.
- Providing CCTV surveillance of these locations (if possible).
- Assisting state and local government entities in determining the most viable response strategies using transportation networks and assets to, from, and within the affected area.

Resource Support

Transportation Biohazard Operational Concept

6.0 Transportation Role in Biohazard Event – cont.

- Providing all available and obtainable transportation resource support including:
 - Prioritizing needs and available resources.
 - Transportation equipment, e.g., passenger and utility vans, buses, trucks and/or trailers; aircraft, aircrews, ground and operations personnel, and communications for transportation of emergency officials.
 - Transportation facilities, e.g., vehicle repair facilities, equipment, and personnel; fleet parking and storage areas to be used for staging, parking, and storage of emergency vehicles; motor pool and vehicle service facilities and personnel for refueling and servicing emergency vehicles.
 - Vehicular traffic management and control signs and devices e.g., barriers, cones of various types, etc.
 - Vehicular traffic flow data and information from permanent and temporary monitoring sites.
 - Access to transportation contracts for hazardous materials clean-up services.
 - Access to transportation's emergency procurement capabilities for other needed equipment, supplies or services.
- Activating mutual aid agreements and other agreements as necessary to obtain additional resources and capabilities.
- Performing traffic management:
 - Identify specific traffic management actions to implement and monitor community response strategies, including traffic control points, access control points, barricade plans and check points.
 - Coordinate the closure of highways, arterials,

- bridges, tunnels, or sections of roadway.
 - Implement traffic control strategies for restricted mobility and restricted access.
 - Coordinate with transportation and contractor personnel to ensure the removal of work zones and other temporary capacity restrictions in or near an affected area, or on detour/diversion routes.
 - Provide any highway clearances, waivers and permits required to expedite the transportation of high-priority materials and personnel or to move contaminated materials.
 - Assign appropriate personnel at key field locations to oversee operations and to provide consistent, verified information on the transportation network.
 - Provide situation updates to jurisdictions near the affected area and coordinate traffic control strategies with these jurisdictions.
- Monitor and control transportation systems and infrastructure, and coordinate transportation activities with other agencies (local, state, and federal).

Support for Emergency Responders

- Implementing emergency responder and public health access and priority strategies (access control points, checkpoints, closures, barricades, etc.).
- Coordinating traffic management, signage, control devices, placement of vehicles and personnel to support restricted mobility conditions, including curfews, voluntary “snow days”, quarantines, etc.
- Supporting delivery of medical supplies, medicines, and medical personnel, including requests from the Strategic National Stockpile, to specific locations near or within the affected area.
- Coordinating the provision of specialized resources, such as refrigerated trucks or facilities, to store medicines and supplies.
- Routing traffic/emergency access points to support the Modular Emergency Medical System, or other structure, established to manage affected citizens and the worried well (Neighborhood Emergency Help Centers, Acute Care Centers, Hospitals, private clinics, etc.).

Transportation Biohazard Operational Concept

6.0 Transportation Role in Biohazard Event – cont.

- Coordinating transportation to provide an *ad hoc* service to bring affected citizens and worried well to sites for medical evaluation, vaccination and dispensation of prophylaxis, and to return them to their homes.
- Coordinating transportation support and community outreach for special populations, such as persons with disabilities, the elderly, school children and incarcerated persons.
- Supporting on-scene management and disposal of biohazard waste and the decontamination of facilities, vehicles and equipment.
- Supporting requests from local, regional, state and federal agencies.
- Determining that emergency response is no longer necessary and the event has ended.

Support for the Public

- Coordinating delivery strategies, vehicles, distribution systems and security to provide resources and support to the public within an affected or restricted area (i.e., food, water, supplies, etc.).
- Monitoring the impacts of the event on the flow of goods into and around the affected area, ensuring sufficient supplies are available for the affected public.
- Coordinating with suppliers and shippers to assess the time required to procure and deliver certain resources necessary to sustain the affected area.
- Coordination with local, state, federal and non-governmental agencies supporting the needs of the affected public.

Other

- Managing Area Wide Transportation
 - Routing/detouring traffic around affected area.
 - Coordinating with other transportation districts/networks regarding shifts in traffic control and likely demand.
 - Managing freight transportation, including mode and location shifts brought about by the biohazard event.
- Supporting agency-wide communications:
 - Provide communications resources in support of state-wide operations.
- Providing public information on the status of the transportation system:
 - Coordinate with public information function established by responding agencies.
 - Coordinate with media outlets and traffic reporting agencies.
 - Prepare press releases.
 - Update Internet information.
 - Deploy traffic control devices and variable message signs.
 - Update highway advisory radio.
 - Update 511 traveler information system.
 - Make motor carrier, railroad and bus notifications.
 - Update road condition reports.
 - Deploy signage and barricades.
- In the event of a situation of known threat or projected release over a defined area, the transportation agency will support:
 - Evacuation of threatened populations to areas of safety/host locations.
 - Evacuation/movement of special populations (school children, persons with disabilities, elderly, incarcerated persons, ambulatory patients in hospitals, etc.) to areas of safety/host locations.
 - Incident management along evacuation routes.
 - “Hot wash”/after-action briefing.

Recovery

Activities performed by the state DOT to support recovery from biohazard events include the following:

Transportation Biohazard Operational Concept

6.0 Transportation Role in Biohazard Event – cont.

- Performing/supporting damage assessments for contaminated facilities and equipment to justify the receipt of federal Stafford Act and Emergency Relief funding.
- Performing permanent repairs/decontamination.
- Routing and permitting of recovery equipment, materials and contaminated debris.
- Public reassurance.
- Restoration of transportation system.
- Evaluating alternatives and making choices regarding activities to take for restoration and recovery.
- Ensuring that a formal after action report and improvement plan are developed and incorporate results of these documents back into the transportation agency's activities for awareness, prevention, preparedness, response and recovery

Transportation Biohazard Operational Concept

7.0 Direction and Control

This section of the Transportation Biohazard Operational Concept describes the system of direction and control that will be used by the state DOT to perform the activities identified in the previous section. State DOTs may wish to use some or all of the following information in preparing this section of their operational concept.

The state DOT will manage its response to a biohazard emergency using the following tools and structures:

- Emergency Activation Levels
- Transportation Incident Management System
- District, Regional, and state-wide Transportation Emergency Operations Center

Emergency Activation Levels

In the state DOT's Emergency Operations Plan, Emergency Activation Levels (EALs) are used to categorize transportation emergency response requirements. EALs support event notification, deployment of resources, and coordination and communication with external agencies. EALs also identify who will be in charge of the state DOT's response to the emergency. EALs include:

- **Level One: Traffic Incident** – an incident that is within the capabilities of a one DOT maintenance section or other business unit to handle. Limited support may be required from external agencies.
- **Level Two: District-wide Emergency** – an event which affects more than one DOT maintenance section or business unit within a District or more than one facility. Response to this incident may require activation of the District Emergency Center. Significant support may be required from external agencies within the District.

- **Level Three: Region-wide Emergency** – an event that affects more than one District within a region. Response to this incident may require activation of the Region-wide Emergency Center. Significant support may be required from external agencies within the Region.
- **Level Four: Major Emergency** – a significant, possibly state-wide emergency in which there is an immediate threat to life and property, where both the state Emergency Operations Center and the state DOT Emergency Operations Center have been activated. Significant support may be required from multiple external agencies throughout the state and possibly from the federal government.

Typically, the District Manager with authority for the location that has experienced the emergency will determine the EAL. Emergencies that require activation of the state Emergency Operations Center are automatically considered Level Four emergencies. The state DOT assumes that most biohazard events would require Level Three or Level Four activation.

Based on the declaration of a Level Three or Level Four emergency, the affected District, Region, or Headquarters Division will establish Emergency Operations Centers and make notifications using the process specified in the state DOT Emergency Operations Plan. This will include, as appropriate, notifications to the state Emergency Operations Center and Emergency Management Agency (if the state Emergency Operations Center is not yet activated), to local and state law enforcement and other responders, to traffic management centers and transportation operations centers, to motor carriers and railroads, to pipelines and airport and transit system, and to the traveling public.

During a biohazard event, the state DOT will continue to operate as a statewide organization with the same chain of command and communications as in normal operations. However, emergency operations may be conducted on a 24-hour basis and may require the adjustment of some headquarters functions and staffs. At the Region and District level, reassignment of field staff and adjustments of assigned duties may be needed.

Transportation Biohazard Operational Concept

7.0 Direction and Control – cont.

Who's in Charge

The District Manager or designee is responsible for managing the state DOT's response to Level One (Traffic Incident) and Level Two (District-wide) emergencies. For fixed facilities, the Facilities Manager or designee is responsible.

The Region Manager or designee is responsible for managing the DOT's response to Level Three (Region-wide) emergencies. If an emergency affects two Districts in different Regions, the Region Managers of the two Regions will determine who should be in charge. Or, they may opt to establish a shared command of the response.

Overall responsibility for providing DOT services during Level Four rests with the DOT statewide Maintenance Engineer or designee. The Office of Maintenance will manage DOT resources and equipment and coordinate DOT activities through the state Emergency Operations Center, if it is activated.

State DOT Incident Management System

The state DOT will use the Incident Management System specified in its Emergency Operations Plan and procedures to direct its response activities in the field, at the Transportation Emergency Operations Center, and at local/state Emergency Operations Centers. The state DOTs Incident Management System enables direct interface with the command and coordinating structures established by local responders and emergency management agencies, including:

- Incident Command System (i.e., single, unified or area command) for field response.
- Local and state Emergency Operations Centers, using pre-designated Emergency Support Functions to coordinate delivery of resources to the affected area.

- Integrated Public Information System, to ensure a consistent message is provided to the public and the media.
- Other command and coordinating structures as identified in the National Response Plan, the National Incident Management System, and state and local Emergency Operations Plan.

The Transportation Incident Management System addresses the roles of:

- Transportation field response structure:
 - Transportation front-line employees;
 - Transportation supervisors;
 - Transportation Incident Commander;
 - Transportation Incident Command Post; and
 - Transportation Incident Management Team.
- Transportation coordinating structure:
 - State-wide Transportation Emergency Operations Center;
 - Regional Emergency Operations Center;
 - District/Division Emergency Operations Centers; and
 - Field Office Emergency Operations Centers.
- Transportation communications structure:
 - State-wide Communications Center;
 - District/Regional Traffic Management Center;
 - District/Regional Transportation Dispatch Centers; and
 - Field Office Dispatch Centers.
- Transportation coordination with local/state Emergency Operations Center:
 - Assigned transportation personnel at these locations.

Transportation Biohazard Operational Concept

7.0 Direction and Control – cont.

NOTE: The state DOT should identify specific responsibilities by job title and department. A sample listing appears below.

- Transportation manager and supporting department/division personnel in charge of Level Three (Region-wide) Emergencies:
 - Transportation field response structure;
 - Transportation coordinating structure;
 - Transportation communications structure; and
 - Transportation coordination with local/state Emergency Operations Center.
- Transportation manager and supporting department/division personnel in charge of Level Four (Major) Emergencies:
 - Transportation field response structure;
 - Transportation coordinating structure;
 - Transportation communications structure; and
 - Transportation coordination with local/state Emergency Operations Center.
- State-wide personnel in charge of activation and management of the state-wide Transportation Emergency Operations Center.
- Regional personnel in charge of activation and management of regional Transportation Emergency Operations Center.
- Specialized functions, such as emergency procurement, construction, engineering, and inventory control.

It is anticipated that responsibilities for coordinating state DOT resources in a biohazard event will be managed by the state-wide Transportation Emergency Operations Center, according to the procedures specified in the state and state DOT Emergency Operations Plans. Transportation resources will be classified using the Emergency Support Functions identified in the state Emergency Operations Plan:

- ESF #1 – Transportation.
- ESF #2 – Communications.
- ESF #3 – Infrastructure (Public Works and Engineering).
- ESF #4 – Firefighting.
- ESF #5 - Emergency Management.
- ESF #6 - Mass Care, Housing, and Human Services.
- ESF #7 - Resource Support.
- ESF #8 - Public Health and Medical Services.
- ESF #9 - Urban Search and Rescue.
- ESF #10 - Oil and Hazardous Materials Response.
- ESF #11 - Agriculture and Natural Resources.
- ESF #12 – Energy.
- ESF #13 - Public Safety and Security.
- ESF #14 - Long-Term Community Recovery and Mitigation.
- ESF #15 - External Affairs.

The state DOT should provide a brief description of its activities to coordinate these resources and reference the appropriate section of the state and state DOT Emergency Operations Plans.

Transportation Biohazard Operational Concept

8.0 Communications

This section of the Transportation Biohazard Operational Concept describes the communications system that will be used by the state DOT during a biohazard emergency. State DOTs may wish to use some or all of the following information in preparing this section of their operational concept.

Communications is the transfer and interpretation of information among persons, places, and machines. It includes transmission of information and data by phone, radio, fax, image, and electronic mail systems.

The state DOT has established defined protocols for information collection and communication among internal department's and with external agencies These protocols are located in (*reference description/procedures for state DOT's communications systems and capabilities*). They include:

- Transportation Agency Notification/Communication:
 - State Emergency Response System;
 - Highways;
 - Motor carriers;
 - Railroads;
 - Public transit;
 - Pipelines;
 - Maritime pilotage; and
 - Aviation.
- Transportation Operations Centers:
 - State-wide;
 - District/Division; and
 - Field Office.
- Emergency Responder Notification/Communication:
 - 911 dispatch center;
 - Local, Regional and State Emergency Operations Centers;
 - Field communications; and
 - Agency-to-agency communications.

- Communication with the public using ITS technology and established systems such as the agencies website.

Protocols for state DOT communications with external agencies are defined in the state DOT's Emergency Operations Plan.



Transportation Biohazard Operational Concept

9.0 Public information

This section of the Transportation Biohazard Operational Concept describes the public information system that will be used by the state DOT during a biohazard emergency. State DOTs may wish to use some or all of the following information in preparing this section of their operational concept.

Based on the EAL assigned to a biohazard event, the state DOT has developed procedures regarding the dissemination of information to the public. Public information dissemination should be handled by the state DOTs established media relations team.

Typical activities performed by state DOT Public Information Representatives include the following:

- Notification of the appropriate public information representative;
- Dispatch of the public information representative to an appropriate location for briefing and information collection;
- Notification and coordination with District, Region and Headquarters personnel regarding the release of information to the public;
- Preparation of media releases to be faxed to major news outlets;
- Provision of information and response to media inquiries;
- Support for press conferences and other interactions with media;
- Coordination of public information release with the Incident Command System Public Information Function; and
- Coordination of public information release with the state Emergency Operations Center.

State DOT procedures govern the preparation of the information to be released to the media. These procedures cover the following activities:

Before activation of State Emergency Operations Center: Before the state Emergency Operations Center is activated, state agencies, including the state DOT, may issue their own news releases about their emergency response activities. Within the state DOT, the Public Information Representatives will work with the Communications Manager to prepare and distribute information about the emergency and traffic control measures to the news media as needed. In some instances, preparation and distribution of information to the news media may be designated to the Transportation Operations Center.

After activation of State Emergency Operations Center: When the state Emergency Operations Center is activated, new releases become the responsibility of the designated Governor's staff. In this situation, the state DOT's Communications Manager will be responsible for coordinating with the Governor's designated representative.

Joint Information Center: During a major emergency which involves many response organizations, using NIMS procedures, a Joint Information Center (JIC) may be established within the state Emergency Operations Center. When a JIC is established, all news releases are issued from this facility. The state DOT's Communications Manager will be responsible for coordinating with the JIC on all news releases involving transportation. Copies of all releases will be forwarded to the state DOT Emergency Operations Centers.

A transportation Public Information Representative may also be assigned to the field response established by local responders using the Incident Command System. From that location, the state DOT Public Information Representative will support the preparation of public information materials from the field. As specified in NIMS, the JIC concept ensures consistency in message among reports from the ICS Public Information Officer at the incident scene, through the responding agencies, to the JIC in the state's Emergency Operations Center.

GLOSSARY

Advanced Life Support (ALS): Medical procedures performed by emergency medical technicians-paramedics that include the advanced diagnosis and protocol-driven treatment of a patient in the field. See also emergency medical technician-paramedic.

Aerosol: A fine mist or spray, which contains minute particles.

Agroterrorism: Terrorist attacks which affect the food supply by destroying crops. Generally, such attacks use animal diseases (i.e., anthrax), natural pests (i.e. the potato beetle), molds or other plant diseases, or defoliation agents (i.e., Agent Orange).

Airborne: Carried by or through the air.

Area Command: An organization established to 1) oversee the management of multiple incidents that are each being handled by an Incident Command System organization or 2) to oversee the management of a very large incident that has multiple Incident management Teams assigned to it. Area Command has the responsibility to see overall strategy and priorities, allocate critical resources based on priorities, ensure that incidents are properly managed, and ensure that objectives are met and strategies followed.

Bacteria: Microorganisms that lack a nucleus and have a cell wall composed of peptidoglycan, a protein sugar molecule, living in soil, water, organic matter or the bodies of plants and animals and being autotrophic or parasitic.

Biological contamination: The presence of an infectious agent on a body surface or on an environmental surface.

Bioterrorism: The threatened or intentional use of microorganisms, or toxins, derived from living organisms, to produce death or disease in humans, animals, or plants.

Bio-safety Level: A method for rating laboratory safety. Laboratories are designated BSL 1, 2, or 3 based on the practices, safety equipment, and standards they employ to protect their workers from infection by the agents they handle. BSL 1 laboratories are suitable for handling low-risk agents; BSL-2 laboratories are suitable for processing moderate risk agents; and BSL 3 laboratories can safely handle high-risk agents.

Carrier: A person or animal that harbors a specific infectious agent in the absence of discernible clinical disease and serves as a potential source of infection.

Casualty: Any person suffering physical and/or psychological damage that leads to death, injury, or material loss.

Category "A" Agents: The possible biological terrorism agents having the greatest potential for adverse public health impact with mass casualties as defined by the Centers for Disease Control and Prevention. The Category "A" agents are: smallpox, anthrax, plague, botulism, tularemia, and viral hemorrhagic fevers (e.g. Ebola and Lassa viruses).

Chain of Command: A series of management positions in order of authority.

Command: The act of directing and/or controlling resources by virtue of explicit legal, agency, or delegated authority.

Communicable Disease: An illness due to a specific infectious agent or its toxic products that arises through transmission of that agent or its products from an infected person, animal, or reservoir to a susceptible host, either directly or indirectly through an intermediate plant or animal host, vector, or the inanimate environment. Synonymous with infectious disease.

Transportation Biohazard Operational Concept

Contagious: Transmitted by contact; in common usage, "highly infectious."

Continuity of Operations Plan (COOP): A COOP provides guidance on the system restoration for emergencies, disasters, mobilization, and for maintaining a state of readiness to provide the necessary level of information processing support commensurate with the mission requirements/priorities identified by the respective functional proponent. This term is traditionally used by the federal Government and its supporting agencies to describe activities otherwise known as Disaster Recovery, Business Continuity, Business Resumption, or Contingency Planning.

Damage assessment: The process used to appraise or determine the number of injuries and deaths, damage to public and private property, and the status of key facilities and services such as hospitals and other health care facilities, fire and police stations, communications networks, water and sanitation systems, utilities, and transportation networks resulting from a man-made or natural disaster.

Disaster: A large emergency event that is beyond the community's ability to address within its own and mutual aid resources.

Disease epidemic: The occurrence of a number of cases of a disease, known or suspected to be of infectious or parasitic origin, that is unusually large or unexpected for the given place and time. An epidemic often evolves rapidly, so that a quick response is needed.

Early warning system: In disease surveillance, a specific procedure to detect as early as possible any departure from usual or normally observed frequency of phenomena.

Emergency: A sudden occurrence demanding immediate action.

Emergency Alert System: A digital technology (voice/text) communications system consisting of broadcast stations and interconnecting facilities authorized by the Federal Communication Commission. The system provides the President and other national, state, and local officials the means to broadcast emergency information to the public before, during, and after disasters.

Emergency management: The efforts of the state and the political subdivisions to develop, plan, analyze, conduct, provide, implement and maintain programs for disaster mitigation, preparedness, response and recovery.

Emergency Management Agency (EMA): Under the authority of the state governor's office, coordinates the efforts of the state's agencies during an emergency or disaster. The EMA also coordinates federal resources made available to the states such as the National Guard, the Centers for Disease Control, and the Public Health Service. Many counties and local municipalities also have EMAs, designated by mayors, other elected officials, and planning boards, to perform similar functions at the local level.

Emergency Operations Center (EOC): The protected site from which state and local civil government officials coordinate, monitor, and direct emergency response activities during an emergency.

Emergency Operations Plan (EOP): The written plan of the state and its political subdivisions describing the organizations, mission, and functions of the government and supporting services for responding to and recovering from disasters. It incorporates applicable provisions of the federal and regional response plans. EOPs are also developed by counties and municipalities.

Emergency Support Function (ESF): A grouping of government and certain private-sector capabilities into an organizational structure to provide the support, resources, program implementation, and services that are most likely to be needed to save lives, protect property and the environment, restore essential services and critical infrastructure, and help victims and communities return to normal, when feasible, following domestic incidents. The ESFs serve as the primary operational-level mechanism to provide assistance to state, local, and tribal governments or to federal departments and agencies conducting missions of primary federal responsibility.

Transportation Biohazard Operational Concept

Epidemic: The occurrence in a community or region of cases of an illness, specific health-related behavior, or other health-related events clearly in excess of normal expectancy.

Epidemiologist: An investigator who studies the occurrence of disease or other health-related conditions or events in defined populations. The control of disease in populations is often also considered to be a task for the epidemiologist, especially in speaking of certain specialized fields, such as malaria epidemiology.

Epidemiology: The study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to control of health problems.

Evacuation: Organized, phased, and supervised dispersal of people from dangerous or potentially dangerous areas (FEMA definition). See also mandatory evacuation; spontaneous evacuation; voluntary evacuation.

Evacuees: All persons removed or moving from areas threatened or struck by a disaster.

First responder: Local police, fire, and emergency medical personnel who arrive first on the scene of an incident and take action to save lives, protect property, and meet basic human needs. This term has increasingly been broadened in recent years to include bystanders who perform search and rescue, transportation, and communication during the incident.

Hazardous material: Any substance or material that when involved in an accident and released in sufficient quantities, poses a risk to people's health, safety, and/or property. These substances and materials include explosives, radioactive materials, flammable liquids or solids, combustible liquids or solids, poisons, oxidizers, toxins, and corrosive materials.

Immunization: Protection of susceptible individuals from communicable disease by administration of a living modified agent (as in yellow fever), a suspension of killed organism (as in whooping cough), or an inactivated toxin (as in tetanus). Temporary passive immunization can be produced by administration of antibody in the form of immune globulin in some conditions.

Incident Action Plan (IAP): A written document, developed by the incident commander or the planning section of the Incident Command System, that details which actions will be conducted by the ICS in response to an incident. These plans are developed for specific time period, often referred to as operational periods, and are based on the specific needs of an incident. The incident commander is responsible for the oversight and implementation of the IAP.

Incident Command System (ICS): A standardized organizational structure used to command, control, and coordinate the use of resources and personnel that have responded to the scene of an emergency. The concepts and principles for ICS include common terminology, modular organization, integrated communication, unified command structure, consolidated action plan, manageable span of control, designated incident facilities, and comprehensive resource management.

Incident Commander: The individual responsible for the management of all incident operations at the incident site.

Incident Command Post (ICP): The location at which the primary command functions are executed. The ICP may be collocated with the Incident Base or other incident facilities.

Incubation period: The time interval between invasion by an infectious agent and appearance of the first sign or symptom of the disease in question. See also latent period.

Information: Processed fact; reporting with or without analysis, often prepared for publication or dissemination in some form and is intended to inform rather than warn or advise. It is also considered to be data that have been transformed through analysis and interpretation into a form useful for drawing conclusions and making decisions.

Transportation Biohazard Operational Concept

Infrastructure: The basic facilities and services necessary for the function of a community or a country, such as transportation and communications systems, power plants, water lines, roads, and public institutions.

Integrated communications: A system that uses a common communications plan, standard operating procedures, clear text, common frequencies, and common terminology.

Intelligence: The product of adding value to information and data through analysis.

Management by Objectives: In ICS, this is a top-down management activity that involves a three-step process to achieve the incident goal. The steps are: establishing the incident objectives, selection of appropriate strategy(s) to achieve the objectives, and the tactical direction associated with the selected strategy. Tactical direction includes selection of tactics, selection of resources, resource assignments, and performance monitoring.

Mandatory evacuation: This is a warning to persons within the designated area that an imminent threat to life and property exists and individuals MUST evacuate in accordance with the instructions of local officials. May also be called a directed evacuation.

Man-made disaster: A disaster that man clearly causes, such as wars, armed conflicts or civil strife, and terrorism.

National Incident Management System (NIMS): Developed by the Department of Homeland Security at the request of the President of the United States, NIMS integrates effective practices in emergency preparedness and response into a comprehensive national framework for incident management. NIMS will enable responders at all levels to work together more effectively to manage domestic incidents no matter what the cause, size or complexity.

National Response Plan (NRP): A plan released by the Department of Homeland Security (DHS) in December 2004 to describe how federal resources will be integrated into emergency response operations at the state and local level. Under the NRP, NIMS will be used to provide a consistent framework to standardize incident management practices and procedures to ensure that federal, state, and local governments can work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents.

Preliminary Damage Assessment (PDA): A mechanism used to determine the impact and magnitude of damage and the resulting unmet needs of individuals, businesses, the public sector, and the community as a whole. Information collected is used by the state as a basis for the Governor's request for a Presidential declaration, and by FEMA to document the recommendation made to the President in response to the Governor's request. PDAs are made by at least one state and one federal representative. A local government representative familiar with the extent and location of damage in the community often participates; other state and federal agencies and voluntary relief organizations also may be asked to participate, as needed.

Quarantine: Restriction of the activities of well persons or animals who have been exposed to a case of communicable disease during its period of communicability (i.e., contacts) to prevent disease transmission during the incubation period if infection should occur. Absolute or complete quarantine is the limitation of freedom of movement of those exposed to a communicable disease for a period of time not longer than the longest usual incubation period of that disease. Modified quarantine is a selective, partial limitation of freedom of movement of contacts, commonly on the basis of known or presumed differences in susceptibility and related to the danger of disease transmission.

Spontaneous evacuation: Residents or citizens in the threatened areas observe an emergency event or receive unofficial word of an actual or perceived threat and without receiving instructions to do so, elect to evacuate the area. Their movement, means, and direction of travel is unorganized and unsupervised.

Transportation Biohazard Operational Concept

Staging area: An area where resources are kept while awaiting assignment.

Standard Operating Procedure (SOP): A set of instructions constituting a directive, covering those features of operations which lend themselves to a definite, step-by-step process of accomplishment. SOPs supplement EOPs by detailing and specifying how tasks assigned in the EOP are to be carried out.

Stockpile: An area or storehouse where medicine and other supplies are kept in the event of an emergency.

Strategic National Stockpile (SNP): A program created to help minimize human suffering and loss of life due to terrorist attacks through ensuring the rapid deployment of lifesaving pharmaceuticals, vaccines, medical supplies and equipment that public health and medical providers could use to treat and assist victims of a terrorist attack. The SNS provides for 12-hour push packages and a vendor-managed inventory (VMI) packages. The 12-hour push package is ready for deployment to reach a designated airfield within 12 hours of federal activation. The VMI package will be shipped to arrive within 24 and 36-hours periods.

Surveillance: Systematic ongoing collection, collation, and analysis of data and the timely dissemination of information to those who need to know so that action can be taken. Surveillance is the essential feature of epidemiological practice.

Vaccination: Procedures for immunization against an infectious disease.

Vector: An organism that carries germs from one host to another, or an insect or any living carrier that transports an infectious agent from an infected individual or its wastes to a susceptible individual or its food or immediate surroundings.

Victim: A person who has been affected by a disaster. There are three classes of victims: primary victims-- those who are affected by the physical impact of the disaster; secondary victims-- those who reside within an affected community or on the border of an affected area and suffer economic loss due to the disaster or actions taken by relief operations; and tertiary victims-- those who are indirectly affected. Tertiary victims may live in the same country, but not necessarily in the disaster areas.

Virus: The causative agent of an infectious disease; any of a large group of submicroscopic infective agents that are regarded either as the simplest microorganisms or as extremely complex molecules that typically contain a protein coat surrounding an RNA or DNA core of genetic material, that are capable of growth and multiplication only in living cells and that cause various diseases in man, plants and animals.

Voluntary evacuation: A warning to persons within a designated area that a threat to life and property exists or is likely to exist in the immediate future. Individuals issued this type of warning or order are NOT required to evacuate, however it would be to their advantage to do so.

Appendix A: Strategic National Stockpile Fact Sheet

Fact Sheet

Centers for Disease Control and Prevention (CDC) Strategic National Stockpile

The Strategic National Stockpile - What it means to you

CDC's Strategic National Stockpile (SNS) has large quantities of medicine and medical supplies to protect the American public if there is a public health emergency (terrorist attack, flu outbreak, earthquake) severe enough to cause local supplies to run out. Once federal and local authorities agree that the SNS is needed, medicines will be delivered to any state in the U.S. within 12 hours. Each state has plans to receive and distribute SNS medicine and medical supplies to local communities as quickly as possible.



What should you know about the medicines in the SNS?

- The medicine in the SNS is FREE for everyone.
- The SNS has stockpiled enough medicine to protect people in several large cities at the same time.
- Federal, state and local community planners are working together to ensure that the SNS medicines will be delivered to the affected area to protect you and your family if there is a terrorist attack.

How will you get your medicine if the SNS is delivered to your area?

- Local communities are prepared to receive SNS medicine and medical supplies from the state to provide to everyone in the community who needs them.
- Find out about how to get medicine to protect you and your family by watching TV, listening to the radio, reading the newspaper, checking the community Web site on the Internet or learning from trusted community leaders.

Helping State and Local Jurisdictions Prepare for a National Emergency

An act of terrorism (or a large scale natural disaster) targeting the U.S. civilian population will require rapid access to large quantities of pharmaceuticals and medical supplies. Such quantities may not be readily available unless special stockpiles are created. No one can anticipate exactly where a terrorist will strike and few state or local governments have the resources to create sufficient stockpiles on their own. Therefore, a national stockpile has been created as a resource for all.

In 1999 Congress charged the Department of Health and Human Services (HHS) and the Centers for Disease Control and Prevention (CDC) with the establishment of the National Pharmaceutical Stockpile (NPS). The mission was to provide a re-supply of large quantities of essential medical

Transportation Biohazard Operational Concept

materiel to states and communities during an emergency within twelve hours of the federal decision to deploy.

The Homeland Security Act of 2002 tasked the Department of Homeland Security (DHS) with defining the goals and performance requirements of the SNS Program, as well as managing the actual deployment of assets. Effective on 1 March 2003, the NPS became the Strategic National Stockpile (SNS) Program managed jointly by DHS and HHS. With the signing of the BioShield legislation, the SNS Program was returned to HHS for oversight and guidance. The SNS Program works with governmental and non-governmental partners to upgrade the nation's public health capacity to respond to a national emergency. Critical to the success of this initiative is ensuring capacity is developed at federal, state, and local levels to receive, stage, and dispense SNS assets.

A National Repository of Life-Saving Pharmaceuticals and Medical Materiel

The SNS is a national repository of antibiotics, chemical antidotes, antitoxins, life-support medications, IV administration, airway maintenance supplies, and medical/surgical items. The SNS is designed to supplement and re-supply state and local public health agencies in the event of a national emergency anywhere and at anytime within the U.S. or its territories.



The SNS is organized for flexible response. The first line of support lies within the immediate response 12-hour Push Packages. These are caches of pharmaceuticals, antidotes, and medical supplies designed to provide rapid delivery of a broad spectrum of assets for an ill defined threat in the early hours of an event. These Push Packages are positioned in strategically located, secure warehouses ready for immediate deployment to a designated site within 12 hours of the federal decision to deploy SNS assets.

If the incident requires additional pharmaceuticals and/or medical supplies, follow-on vendor managed inventory (VMI) supplies will be shipped to arrive within 24 to 36 hours. If the agent is well defined, VMI can be tailored to provide pharmaceuticals, supplies and/or products specific to the suspected or confirmed agent(s). In this case, the VMI could act as the first option for immediate response from the SNS Program.

Determining and Maintaining SNS Assets

To determine and review the composition of the SNS Program assets, HHS and CDC consider many factors, such as current biological and/or chemical threats, the availability of medical materiel, and the ease of dissemination of pharmaceuticals. One of the most significant factors in determining SNS composition, however, is the medical vulnerability of the U.S. civilian population.



The SNS Program ensures that the medical materiel stock rotated and kept within potency shelf-life limits. This involves quarterly quality assurance/quality control checks (QA/QC's) on all 12-hour Push

is

Transportation Biohazard Operational Concept

Packages, annual 100% inventory of all 12-hour Push Package items, and inspections of environmental conditions, security, and overall package maintenance.

Supplementing State and Local Resources

During a national emergency, state, local, and private stocks of medical materiel will be depleted quickly. State and local first responders and health officials can use the SNS to bolster their response to a national emergency, with a 12-hour Push Package, VMI, or a combination of both, depending on the situation. The SNS is not a first response tool.



Rapid Coordination & Transport

The SNS Program is committed to have 12-hour Push Packages delivered anywhere in the U.S. or its territories within 12 hours of a federal decision to deploy. The 12-hour Push Packages have been configured to be immediately loaded onto either trucks or commercial cargo aircraft for the most rapid transportation. Concurrent to SNS transport, the SNS Program will deploy its Technical Advisory Response Unit (TARU). The TARU staff will coordinate with state and local officials so that the SNS assets can be efficiently received and distributed upon arrival at the site.

Transfer of SNS Assets to State and/or Local Authorities

HHS will transfer authority for the SNS materiel to the state and local authorities once it arrives at the designated receiving and storage site. State and local authorities will then begin the breakdown of the 12-hour Push Package for distribution. SNS TARU members will remain on site in order to assist and advise state and local officials in putting the SNS assets to prompt and effective use.

When and How is the SNS Deployed?

The decision to deploy SNS assets may be based on evidence showing the overt release of an agent that might adversely affect public health. It is more likely, however, that subtle indicators, such as unusual morbidity and/or mortality identified through the nation's disease outbreak surveillance and epidemiology network, will alert health officials to the possibility (and confirmation) of a biological or chemical incident or a national emergency. To receive SNS assets, the affected state's governor's office will directly request the deployment of the SNS assets from CDC or HHS. HHS, CDC, and other federal officials will evaluate the situation and determine a prompt course of action.



Training and Education

The SNS Program is part of a nationwide preparedness training and education program for state and local health care providers, first responders, and governments (to include federal officials,

Transportation Biohazard Operational Concept

governors' offices, state and local health departments, and emergency management agencies). This training not only explains the SNS Program's mission and operations, it alerts state and local emergency response officials to the important issues they must plan for in order to receive, secure, and distribute SNS assets.

To conduct this outreach and training, CDC and SNS Program staff are currently working with HHS, Regional Emergency Response Coordinators at all of the U.S. Public Health Service regional offices, state and local health departments, state emergency management offices, the Metropolitan Medical Response System cities, the Department of Veterans' Affairs, and the Department of Defense.

Appendix B: Sample State EOP Appendix For The SNS Program

I. SITUATION AND ASSUMPTIONS

- A. The federal government, through the U.S. Department of Health and Human Services (HHS), Centers for Disease Control and Prevention (CDC), has established a Strategic National Stockpile (SNS) Program, formerly the National Pharmaceutical Stockpile (NPS) Program. The SNS is outfitted with medical supplies to treat a chemical or biological attack effecting the population of the United States.
- B. The SNS medical stockpile consists of two types of packaged supplies. The first package is the immediate response “12 Hour Push Package” designed for immediate deployment. The package is intended to arrive on site 12 hours after request by the state. The second package is the Vender Managed Inventory Supply (VMI) Package designed as a multi-phase response. This package can be tailored to the incident and be available at the site of the incident 24 to 36 hours after it is requested.
- C. SNS medical supplies may be requested for combating sickness in humans.
- D. Requests for the 12 Hour Push Package and the VMI Package will be made through the State Emergency Management Agency (EMA) by local government.
- E. The State Department of Public Health (SDPH) will coordinate and supervise the reception of the 12 Hour Push Package and the VMI Package.
- F. _____ is the preferred entry port for the 12 Hour Push Package. The Air National Guard facility at the airport will be used as a warehouse to break up the medicines into allotments for distribution to local health centers. Transportation of the medicine to local health centers will be by truck.
- G. The SNS medical supplies will be accompanied by CDC representatives who will provide technical support to the state in the sorting of the medical supplies into useable allotments.
- H. A representative of the SDPH will sign for SNS medical supplies destined for use in the state and arriving through an airport outside of the state. The host state’s designated SNS warehousing and distribution center will be used.
- I. SNS medical supplies destined for another state but arriving at a state airport will be signed for by a representative of the state receiving the medical supplies. If requested, the state will make available its SNS warehousing and distribution center to the receiving state.
- J. The SDPH in cooperation with the state EMA will oversee the break out, distribution and closeout of the push package and other medical supplies requested under this program.

Transportation Biohazard Operational Concept

II. MISSION

To deliver the necessary medical supplies to an area experiencing a biological or chemical attack, or to lessen pain and suffering, or minimize the potential loss of life due to the lack of medical supplies and material resulting from a man-made or natural disaster.

III. DIRECTION AND CONTROL

- A. The SDPH will be the lead agency in the management of the 12 Hour Push Package and the VMI Package.
- B. The State Department of Transportation (DOT) will assist the SDPH by coordinating the acquisition of trucks, clearances (if necessary) and routes to move the medical supplies.
- C. The State Department of Public Safety (DPS) will assist the SDPH by coordinating security for the warehousing, transporting and distribution of medical supplies.
- D. Receipt of day-to-day inventory control of SNS supplies will be under the direction of a person holding a controlled substance license from the U.S. Drug Enforcement Agency.
- E. The state EMA will provide overall coordination of the reception, distribution and closeout of aid received through the CDC.
- F. A Unified Command System will be set up to manage the brake out and distribution of the push package.

IV. CONCEPT OF OPERATIONS

A. State Level

- 1. All coordination of the requesting, warehousing, sorting, transporting and distribution of the SNS medical supplies will take place in the State Emergency Operations Center (EOC). The state EOC will also be activated if the state serves as a receiving point for SNS medical supplies destined for distribution in the state or in another state.
- 2. The Governor or the Governor's designee will request a 12 Hour Push Package or a VMI Package from CDC upon recommendation of the Secretary of the SDPH.
- 3. A designee of the SDPH will sign for medical supplies received by the state from the SNS Program at the airport receiving the supplies.
- 4. The state EMA will establish a mobile command post at the site where the push package is located for distribution.
- 5. Once the SNS medical supplies are turned over to the state, the SDPH will institute a program to track the warehousing, sorting, transportation and distribution of the medical supplies.

Transportation Biohazard Operational Concept

6. Distribution of the SNS medical supplies at the local level will be based on a priority list developed by the local health department. The Commissioner of the SDPH will request that the Governor issue an emergency health declaration. A generic prescription to allow distribution of medicines to be issued to individuals in mass distribution will be issued by the Commissioner of the SDPH.
7. The state EMA will coordinate the release of any information concerning medical supplies received through the SNS Program.
8. SNS supplies received through the _____ airport will be taken to the _____ Air National Guard facility for warehousing and sorting before being transported to local medical supply reception centers.
9. SNS supplies received through other airports in the state will be taken to a hanger at the airport for warehousing and sorting before being transported to local medical supply reception centers.
10. The state DPS will coordinate security in and around the SNS medical supplies while being warehoused and sorted if the delivery point is in the state. DPS will also coordinate security during transportation to local distribution points.
11. Hospital bulk supplies will be sent to hospitals and alternate hospital facilities for internal use.
12. Medicine for distribution to the general public will be from non-medical facilities such as schools.
13. The state DOT will coordinate the transportation of SNS medical supplies within the state. If available, National Guard resources will be used to assist.
14. SNS medical supplies may be brought through airports located in surrounding states. When SNS medical supplies are brought through an airport in a neighboring state a representative of the SDPH will meet the aircraft and sign the receipt for the cargo. The neighboring state will make available its SNS designated warehouse and sorting facility. The neighboring state will also provide security for the facility. The state DOT will be responsible for arranging transportation to the local distributions points.
15. SNS medical supplies brought through an airport located within the state at the request of a neighboring state will be hand-receipted by the requesting state. The state's pre-designated SNS warehousing and sorting facilities will be offered to the requesting state. DPS will coordinate security for the SNS medical supplies while in the state. SDPH will coordinate any request for assistance in storing and sorting the medical supplies.
16. The state EMA will oversee the closeout of any surplus medical supplies remaining after the termination of the incident.

B. County Level

1. Local health departments (LHD) have developed plans for the reception of Push Package and VMI Package medical supplies, requested through SDPH, and for

Transportation Biohazard Operational Concept

distributing these supplies to distribution centers.

2. Medical supplies delivered to the local health department will have been broken into individual distribution sub packages. The LHD will subdivide the shipment into the number and type of medical supplies each prophylaxis distribution center or health service provider has requested.
3. Depending on the nature and type of medical supplies received at the LHD reception center, the supplies received will be sent either to the hospitals or prophylaxis stations.
4. In the event of a major emergency, the LHD's may have activated their Modular Emergency Medical System, in which case, prophylaxis stations may located at designated Neighborhood Emergency Help Centers and Acute Care Centers.
5. Prophylaxis stations have been identified by LHDs for first responders/medical community and the general population. LHD plans exist for the staffing and operating of the prophylaxis stations.
6. The county Emergency Management Director will coordinate the overall county response to the reception of and distribution of the Push Package and VMI contents.
7. Reception of the Push Package and VMI contents by the LHD, the distribution to hospitals or prophylaxis centers, and the distribution to individuals of the medical supplies by the prophylaxis centers will be undertaken using the Unified Incident Command System.

ADMINISTRATIVE SUPPORT

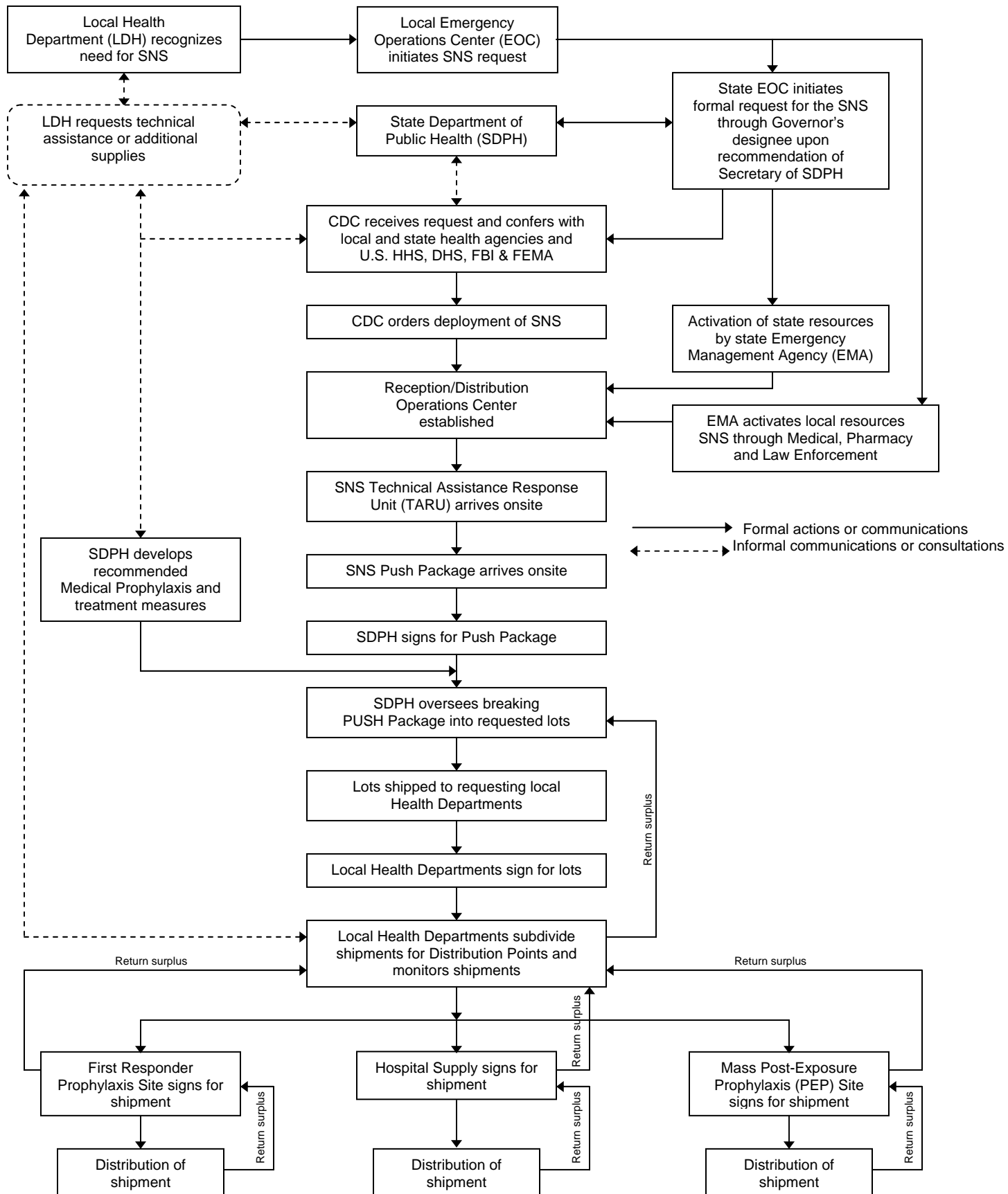
Assistance to help in sorting, re-packaging and distribution of SNS medical supplies will be requested by the state EMA from the State Pharmaceutical Association, State Medical Association, State Nursing Association, State Veterinarian Medical Association and local Health Departments. The state EMA will also request assistance from other states if necessary. Under the provision of the Emergency Management Assistance Compact, the state EMA can request the Federal Emergency Management Agency to activate for assignment to the state a DEMAT Team or a Metropolitan Medical Response System Team.

FLOW CHART

The Flow Chart below provides a visual illustration of the process used to manage the request, receipt, warehousing, break-up and delivery of medical supplies from the SNS.

Transportation Biohazard Operational Concept

Flow Chart for Activation of 12-Hour Push Package



Appendix C: Modular Emergency Medical System

Many experts believe that a biological incident has the potential to significantly overwhelm the health and medical capabilities of most U.S. cities. Recognizing this threat, in the late-1990s, the U.S. Departments of Defense, Health and Human Services, Energy and Agriculture, working with and the Federal Emergency Management Agency and the Federal Bureau of Investigation developed a joint strategy to support response to such an incident in local communities. This strategy is called the Modular Emergency Medical System or MEMS.

This strategy outlines response measures that can be tailored to the particular needs of individual communities and to a variety of possible scenarios. One major obstacle to an effective biological incident response is that most communities have limited ability to expand their health and medical capacity using the existing infrastructure. Modern trends to become leaner and more efficient have forced hospitals, and other aspects of the health and medical system, to do away with abundant surge capacity.

The MEMS helps communities compensate by providing a framework that outside disaster medical resources can quickly and effectively integrate with, and that augments local health and medical efforts. The initial response framework of the MEMS is established through rapid mobilization of available medical assets into two types of expandable patient care modules: Neighborhood Emergency Help Centers (NEHCs) Acute Care Centers (ACCs).

NEHCs function as high-volume casualty reception centers, performing victim triage and dispensing prophylactic medications and self-help information. ACCs function as mass inpatient care facilities designed to augment hospital capacity to admit incident victims. A network of these pre-planned medical facilities enhances a community's capability to care for large numbers of incident casualties by converting non-hospital facilities into standardized mass care centers. By augmenting the local health and medical infrastructure, critical portions of the existing systems, such as hospitals and 9-1-1 Emergency Medical Services, will continue to function effectively.

This is particularly important because it ensures that the local medical system will continue to meet the needs of the incident victims as well as the needs of non-incident related patients. The modular design of the MEMS has built-in flexibility that allows integration of multiple components. A network of standardized modular care centers can be easily expanded or contracted as resources are made available and as the incident requires.

The ACC and NEHC, integrated with an aggressive community outreach effort and a dedicated casualty transportation system, work together to provide a wide range of care and services to the victims of a biological terrorism incident.

Current medical systems of most metropolitan communities in the United States include public and private area hospitals, outpatient clinics, ancillary care organizations, and private physicians. Together these organizations have an enormous amount of resources that would be needed in a biological incident. Unfortunately, because these assets are loosely organized at best, with no unified authority, their efforts will be disjointed and inefficient. By establishing a structured unified medical command, communities will have a more effective means to harness and optimize available resources.

The MEMS strategy allows communities to do this during emergency operations through the activation of preplanned communication links. The organization and management of the MEMS is based on the Incident Command System/ Incident Management System (ICS/IMS), which is

Transportation Biohazard Operational Concept

already utilized nationally by the emergency services community to define roles and structure command and control relationships. Under the MEMS, local hospitals are linked to NEHCs and ACCs and coordinate and direct patient care, medical logistics, and information flow.

To execute the MEMS strategy, participating hospitals, clinics, and private medical doctors would temporarily forego their autonomy and jurisdictional medical statutes, and function as a unified system. Such drastic measures will be necessary to successfully minimize the morbidity and mortality of a catastrophic event. In emergency situations, individual area hospitals and their associated centers could be linked to the community's ICS to form the basis of a unified medical command structure.

For example, as an incident escalates, each local hospital implements its internal disaster plans and establishes an emergency Medical Command Center (MCC). As hospitals reach capacity and are no longer able to divert patients to other hospitals, they would request that the city activate the MEMS to provide necessary relief. The city activates emergency mobilization and acquisition plans to establish NEHCs and ACCs at predetermined locations. As the temporary care centers are established, they would be linked to a supporting hospital. ACCs will allow hospitals to transfer and redirect admitted patients that require non-critical and supportive care. At the same time, outpatient clinics may be expanded into NEHCs, helping direct non-critical and psychosomatic casualties away from hospital emergency departments.

The MCC would allow hospitals to coordinate and direct health and medical operations throughout a predetermined geographic sector, while a unified medical command directs operations at the city level. Some communities might prefer an alternative approach to this organization by establishing the ACCs and NEHCs as stand-alone facilities not associated with area hospitals. This approach would make command, control, and logistical support of the centers a direct responsibility of the community's city-level authorities (e.g., public health department or emergency management office).

In addition to ACCs and NEHCs, the MEMS makes use of a community outreach effort, which could be organized by local law enforcement, fire, or volunteer organizations to facilitate the medical response and public information efforts. If needed, the outreach could conduct a door-to-door sector survey of severely affected communities, identifying victims that are otherwise unable to access necessary care. In an incident that is thought to involve a highly contagious disease, it may be best to isolate individuals from one another and avoid mass gatherings. In such an incident, authorities could instruct citizens to stay home and receive assistance via community outreach.

The MEMS also calls for establishment of a dedicated casualty transportation system to facilitate the movement of patients between various care centers (e.g., NEHCs, hospitals, and ACCs). The casualty transportation component is critical to the success of the MEMS as it will expand the community's patient movement capacity, regulate patient flow throughout the medical system, optimize system-wide resource utilization, and ensure timely care.

Such a system might also become necessary if authorities choose to transfer non-incident related patients from local hospitals to distant locations in order to provide additional space for incident victims. Under such a situation, the casualty transportation component of the MEMS could function as the local link to the National Disaster Medical System (NDMS) orchestrated by the U.S. Department of Health and Human Services.

Transportation Biohazard Operational Concept

It is highly unlikely that the amount of resources and the number of victim care centers needed will be known at the on-set of the incident. It will also be difficult to predict the particular needs of victims. Therefore, biological incident response plans must be extremely flexible to accommodate the range of possibilities. The MEMS is a flexible strategy that allows communities to effectively meet the time-critical needs of biological incident victims. The MEMS modular approach can be expanded and contracted as needed. By constructing an emergency network of participating medical organizations, pre-selecting locations for establishing temporary medical centers, and developing personnel mobilization plans and resource acquisition plans, communities will be better prepared to respond quickly and efficiently.

Appendix D: Representative Scenarios

Three different representative biohazard scenarios, presented below, demonstrate the wide range of policy responses that a biohazard incident could require. These scenarios reflect the results of discussion held during the operational concept validation workshop in Madison, Wisconsin on July 17, 2005. Each scenario identifies the potential roles, responsibilities, needs, available resources, and current practices of transportation agencies in managing each type of potential event based on three standard types of events:

Scenario 1: Overt (detected) biohazard agent release in open outdoor facility.

Scenario 2: Covert (undetected) aerosolized release of a communicable agent.

Scenario 3: Covert (undetected) contamination of livestock.

Each scenario offers answers to such questions as:

1. What are the expectations for transportation support during the scenario identified by external responders (public health, public safety agencies, emergency operations center, National Guard, departments of agriculture/veterinary services)?
2. What are the activities actually performed by transportation responders during the scenario? Do these activities address the expectations of the external responders?
3. How do transportation agencies work with the external agencies to prioritize activities to be performed? Are transportation resources and capabilities sufficient to meet the needs of external agencies within the required timeframe?
4. How do transportation agencies use communications and other technologies to support response to the scenario?

As a conclusion to each scenario, a table summarizing identifying each identified action and its role in the various phases of emergency management is provided. These tables can be expanded and tailored by each state DOT in developing their own scenarios.

Transportation Biohazard Operational Concept

SCENARIO 1: OVERT (DETECTED) RELEASE OF A BIOHAZARD AGENT IN AN OPEN OUTDOOR FACILITY

October 2005

As a result of increased volume of intelligence chatter, the Homeland Security Advisory System level has been raised to Orange, indicating a “high risk of terrorist attacks.” The State’s law enforcement agencies, which are already implementing orange-level security measures, are considering instituting additional security measures at government buildings, airports, water supply systems, and other critical facilities. While the information warrants a change in the Homeland Security Advisory System, no specific method of attack or potential target has been identified.

It is Homecoming weekend (Oct. 21-23, 2005) at the University of Wisconsin-Madison. On Saturday afternoon, it is partly cloudy and 50 degrees, with temperatures expected to drop into the 40s by evening. Approximately 75,000 fans are gathered at Camp Randall Stadium to watch the Badgers take on the Purdue Boilermakers. During the second quarter, CNN, ESPN, and other television networks begin broadcasting stories of possible terrorist incidents at three college football games along the East Coast.



Shortly after the beginning of the broadcasts, a small crop-duster plane flies low over the Camp Randall Stadium, drawing the attention of the crowd away from the game. By this time, fans with radio headphones have heard news reports of the incidents at the other football stadiums and are now alerting others and rapidly leaving the stands.

Summary

Transportation’s Role

Transportation agencies would focus mainly on the movement of the exposed population out of the affected area and on the movement of medical supplies and emergency management personnel throughout the area. Support from law enforcement, district health authorities, and hazardous materials decontamination authorities would be needed.

The first major role of transportation officials would be the creation of dedicated transportation corridors for emergency management personnel. For some agencies, the single largest tool at their disposal may be the use of a Civil Air Patrol airplane that would be already in the air prior to the attack. With the help of the airplane, traffic patterns could be monitored from the air. A question can be raised regarding the potential grounding of all aircraft in the area after such an attack and the possible loss of that asset.

The next transportation-related action of concern is the delivery of vaccine or prophylaxis to smaller distribution centers. The first logistical concern is that vaccine supplies would likely need to be refrigerated during transport. Acquiring refrigerated vehicles is not deemed to be a problem; however, there may be some concern that contracts might not be in place with private carriers to

Transportation Biohazard Operational Concept

transport the vaccine in an emergency situation. Another logistical concern is choosing locations for the distribution of vaccine or prophylaxis. In lessons learned from training exercises in which fire stations were chosen as the distribution points, stations had difficulty dealing with the ensuing volume of traffic. Schools and community centers should be considered for use as possible distribution centers.

A final transportation-related action is the transport of the exposed population to and from the vaccine distribution facilities. Contracts may need to be in place with local transportation groups (e.g., local Metro Transit Agency, private fleet operators) to provide such services in the event of a bio-terror attack.

Potential Role of ITS Technology to Facilitate Response

The potential use of ITS technologies could improve the response to this scenario. Aside from the use of technologies related to traffic management and dissemination of information to the public, the use of closed-circuit television (CCTV) cameras and traffic-signal controls would be useful tools to facilitate the flow of traffic. Additional funding may be needed to acquire these technologies.

The use of highway variable message signs would be a useful tool as a method of providing information to the general public. In some states variable message signs are owned by private businesses. Contracts with these businesses would need clear language on the control, use and rapid deployment of these signs

Additional Areas for Discussion

In this scenario, there may be a possible disconnect between those individuals monitoring the traffic situation and those in charge of making decisions about response to the emergency. Madison does not have a dedicated traffic control center, therefore there may be concern as to who would fulfill the role of monitoring the traffic network and providing information to decision-makers. In this situation, it may be necessary to transition decision-making from the stadium control center to a control center somewhere outside of the contaminated area. In that those in the stadium control center were probably contaminated by the attack, control should be passed on to a separate decision-making group. Therefore plans for this transition would need to be established.

In this scenario, mass decontamination may present a problem. Due to the size of the exposed population, the time-consuming nature of decontamination, and the knowledge that the local hospital decontamination facilities can only process six people per hour, decontamination facilities may only be used on health-care providers and first responders rather than the general population.

The University of Wisconsin stadium has no formal transportation plan in the event of an emergency at the stadium. To facilitate evacuation, a formal transportation component would need to be incorporated into the emergency management plan for the stadium.

Summary Table of Identified Actions

As previously discussed, standard emergency management activities fall into 5 categories: awareness, prevention, preparedness, response and recovery. The following table summarizes identified actions and their management phase. Most of the actions described are in chronological

Transportation Biohazard Operational Concept

order; however, some actions would take place concurrently. Not all of these actions would require support from transportation agencies:

Action	Awareness	Prevention	Preparedness	Response	Recovery
Isolation and evacuation of the exposed population,				▲	
Investigation into the type of agent and range of contamination,				▲	
Creation of transportation corridors for delivery of emergency supplies and first responders,				▲	
Delivery of vaccine or prophylaxis to smaller distribution centers, and				▲	
Transport of exposed population to and from vaccine/prophylaxis distribution centers				▲	

Transportation Biohazard Operational Concept

SCENARIO 2: COVERT (UNDETECTED) RELEASE OF A COMMUNICABLE AGENT

November 2005

Federal intelligence agencies are currently monitoring several threats to determine their credibility. As a result of increased volume of intelligence chatter, the Homeland Security Advisory System level has been raised to Orange, indicating a “high risk of terrorist attacks.” The State’s law enforcement agencies, which are already implementing orange-level security measures, are considering instituting additional security measures at government buildings, airports, water supply systems, and other critical facilities.

On November 15, hospitals in and around the Madison area noticed a sharp increase in patients complaining of flu-like symptom. The hospital with the most cases is at the University of Wisconsin. The numbers increase sharply over the next 24 hours, and by the time of the nightly news it is the major story in local media markets. Over 1,000 patients have complained of the “flu” and over a dozen deaths are associated with it. Media reports speculate on the cause of the outbreak, but nothing is certain. On November 16, there is a sharp increase in absenteeism from local schools, and businesses, apparently as people try to isolate themselves and their families from exposure to an unknown illness.



Also on November 16, the initial sputum culture results from the earliest samples collected are available, and the findings are initially positive for *Yersinia pestis* – plague. Samples are immediately sent to the State Laboratory of Hygiene for further analysis and confirmation. Given the nature of pathogen and the number of people potentially exposed, it seems highly likely that this is an intentional act of terrorism. The FBI is called in and they, along with law enforcement agencies and epidemiologists, begin an exhaustive search to try to identify the source of the plague.

By the morning of November 17, medical facilities in the area are stretched beyond capacity. All report a shortage of medical supplies, especially ventilators. As news of the crisis spreads, everyday life in Madison and other nearby communities stops completely. Many businesses are closed. Some municipal services (e.g., trash pick-up, public transportation) are disrupted because of a lack of staff. Large numbers of people are fleeing the area by whatever means available. Others converge on medical facilities seeking “vaccines.”

Summary

Transportation’s Role

Several challenges are identified regarding the hospitals response to the situation, including the ability to identify the outbreak, and the capacity to handle multiple hotspots within the State of Wisconsin. While it is not certain that a full quarantine of the city or a section of the city would be necessary, the process for ordering and carrying out quarantine raises some issues.

Local transportation agencies and law enforcement would need to restrict access into and out of certain affected areas, provide alternative routing for freight transportation around the affected area, while providing continuing access for supplies and personnel into the affected area. Orders

Transportation Biohazard Operational Concept

could be issued to close or restrict the ports on Lake Michigan and to restrict air travel into and out of the city. The transportation network would need to be configured to support the enforcement of voluntary travel restrictions and curfews.

Some transportation role might be required to transport patients not affected by the outbreak to overflow locations. Transit vehicles could be used to transport affected persons as well, although decontamination would be required later. Transport of patients could also involve escorts or road closures.

Regarding the delivery of supplies and personnel to quarantine areas, it is suggested that oversize or overweight vehicles owned by transportation agencies would be useful. The U.S. Postal Service could be used as a potential network for delivery of information and supplies to individual households. There is an assumption that with appropriate public information and reassurance, many people might voluntarily isolate themselves at home during this event. Under quarantine conditions, of course, citizens would be restricted to their homes.

Potential Role of ITS Technology to Facilitate Response

For most agencies, the tools necessary to provide traffic management and public information are available including reverse 911, 511, Amber Alert, and Highway Advisory Radio. It is noted that interoperability of the communications systems used by emergency responders would be very important.

Additionally, transportation system models and traffic monitoring technology could be used to develop and monitor alternate routes around quarantine areas.

Additional Areas for Discussion

The U.S. Postal Service's response plans for biohazard incidents could serve as models for broader efforts. The U.S. Postal Service is making efforts to prepare for biohazard incidents at its mail distribution facilities. The Postal Service is planning to put biohazard sensors in each of its roughly 240 distribution facilities by the end of 2005. It has also conducted full-scale exercises at some of the facilities. The Postal Service has created a one-call alert system for employees at the facilities.

Wisconsin is making plans for managing the surge in hospital patients that could occur during a biohazard incident. James Monarski of the Health Resources and Services Administration has said that his agency is working on the transportation issues involved in managing surges in patient flows at hospitals.

Tom Anderson of the Wisconsin Department of Health and Family Services has said that there were approximately 13,000 hospital beds in the state and that hospitals could probably double that number in an emergency. Hospitals are working together at different scales to manage potential patient flows. This cooperation often takes the form of mutual-aid agreements.

For some agencies mutual-aid agreements might not very useful in the case of multiple hot spots or widespread outbreak of disease. For some states, a large percentage of emergency medical service (EMS) staff in the state are volunteers which could affect their willingness to participate in the management of a biohazard situation.

Transportation Biohazard Operational Concept

Summary Table of Identified Actions

Below is a summary of identified actions as likely responses to the scenario described above. Not all of these actions would require support from transportation agencies:

Action	Awareness	Prevention	Preparedness	Response	Recovery
Identification of biohazard event (recognizing that patients are presenting symptoms of plague versus other regular high occurrence of respiratory illnesses or a natural outbreak of Avian influenza)				▲	
Initial public health coordination, tracking and situation assessment				▲	
Management of patient surges at hospitals (re-configuring to provide additional beds and isolation rooms, and obtaining additional ventilators, medicine, etc.)				▲	
Notification and activation of county, regional and state Emergency Operations Centers (EOCs)				▲	
Declaration of state of emergency and request for federal response				▲	
Request to CDC to release Strategic National Stockpile (SNS)				▲	
Activation of incident command system and command centers,				▲	
Distribution of medical equipment and SNS supplies				▲	
Public information campaign				▲	
Support for decisions from public health agencies (voluntary restrictions, quarantine, etc.)				▲	
Criminal investigation				▲	
Activation of National Guard				▲	
Establishment of statewide public health advisory network				▲	
Management of "worried well"				▲	
Care of special populations (e.g., elderly, disabled, incarcerated)				▲	
Assessment of staffing of public safety officers:				▲	
Roles and responsibilities of law enforcement during quarantine and travel restriction,			▲	▲	
Staffing rotations and assignments,			▲		
Providing information on personal protection (standard medical protocols and hygiene regimen),			▲		

Transportation Biohazard Operational Concept

Action	Awareness	Prevention	Preparedness	Response	Recovery
Posting officers at hospital rooms – isolation and mini-quarantine orders,				▲	
Posting officers at pharmacies and treatment/distribution centers,				▲	
Protecting SNS resources,				▲	
Managing desertion rates and fear				▲	
Transport of infectious materials (to labs and between labs)				▲	
Mobility restriction/quarantine of affected areas:				▲	
Modeling of transportation system to identify chokepoints and change traffic signal timing			▲		
Alternate routing around affected areas			▲		
Provision of food and supplies to affected areas				▲	
Closing of ports on western Lake Michigan (U.S. Coast Guard)				▲	
Establish liaison with media				▲	
Establishment of official website for distribution of information			▲		
Closing of public transit systems, suspension of air travel				▲	
Utilization of U.S. Postal Service to deliver information and/or medications				▲	
Activation of Reverse 911				▲	

Transportation Biohazard Operational Concept

SCENARIO 3: COVERT (UNDETECTED) CONTAMINATION OF LIVESTOCK

October 2005

The Homeland Security Advisory System level is at Orange, indicating a “high risk of terrorist attacks.” Although no specific threats have been identified, intelligence reports indicate that attacks against the nation’s agricultural, energy, and transportation sectors are likely. The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) has issued an advisory urging the agricultural community to be on the lookout for suspicious activity in and around farms and at events that include livestock and agricultural products.

As part of the World Dairy Expo taking place in Madison from October 4th to October 8th, several Madison-area dairies are giving farm tours to Expo attendees. One of the participating dairies is Jones Brothers Farm in Waterloo, a farm with 500 milking cows and 1,200 total head of cattle.



October 10, 2005

Mark Jones of Jones Brothers Farms noticed that two of his cattle were salivating excessively and appear to be running a fever, while several other head were acting more lethargic than normal and had refused their morning feed. Jones isolated the ailing cattle from the rest of the herd and called the local veterinarian to check the cattle for foot and mouth disease (FMD).

The local veterinarian arrived and found that the cattle had elevated temperatures and that large portions of the epithelial surface of their tongues were detached. A few also had blisters in their mouths and sores on their feet. He immediately called the USDA Veterinary Services office and alerted them he suspected FMD. A veterinarian trained in diagnosing foreign animal diseases was dispatched to the farm to draw samples and ship them to USDA’s Foreign Animal Disease Laboratory at Plum Island, N.Y., the federal laboratory where foot-and-mouth disease diagnoses are made. The farm is quarantined.

October 11, 2005

The Plum Island test results show that the cattle were infected with foot and mouth disease. They show that the cattle were infected within the previous 72 hours. A local veterinarian receives a call about cattle salivating excessively from a dairy farm in nearby Lake Mills that also hosted tours for the World Dairy Expo.

The Governor declares a state of emergency, and the emergency operations center in Madison is activated under the joint command of the state veterinarian and the federal veterinarian-in-charge for Wisconsin.

Summary

Transportation’s Role

Transportation Biohazard Operational Concept

A key activity in this response is the early involvement of transportation agencies (and law enforcement) in enforcing the quarantine of affected farms and the re-routing of traffic around the quarantine areas. It is thought that transportation agencies currently have sufficient resources and capabilities to carry out this particular action.

Regarding the enforcement of a stop animal movement order, the state DOT would coordinate the enforcement of this order with FHWA, the Federal Motor Carrier Safety Administration (FMCSA), and the DOTs of neighboring states. The state DOT might also coordinate with private carriers. The State Patrol and possibly the National Guard would be needed to enforce the order at state borders and possibly at weigh stations. It is unsure whether transportation agencies are currently prepared to enforce a stop movement order in a timely manner.

It is recognized that during the period that a stop movement order was in effect, it would be necessary to care for animals stopped in transit. Transportation agencies might play a role in directing carriers to holding locations (e.g., county fairgrounds) or in supplying food and water for animals stopped in transit. However, it is uncertain exactly how the stop movement order would be implemented and maintained and what type of support transportation agencies would be asked to provide.

There may be a potential role for transportation agencies in the disposal of animal carcasses. Heavy equipment owned by state and local transportation officials could be used to transport or bury carcasses. This equipment would need to be decontaminated afterwards. Decontamination of weigh stations, truck stops, or other affected transportation infrastructure would be needed as part of the recovery from the biohazard incident.

Potential Role of ITS Technology to Facilitate Response

The potential use of ITS technologies focused on enforcement of the stop movement order. Highway variable message signs could be used to alert carriers of livestock about the stop movement order, but these signs are not widely deployed throughout Wisconsin. It may be necessary to employ other communications tools, such as Highway Advisory Radio and the federal Highway Watch network, which is capable of sending out alerts to its participants.

The use of Commercial Vehicle Information Systems and Networks (CVISN) technology might be helpful. This technology is used to provide information to officials involved in roadside enforcement of motor carrier regulations. Information provided by CVISN might be useful in tracking the movement of particular carriers or in enforcing a stop animal movement order.

Additional Areas for Discussion

Last year, Wisconsin enacted the nation's first mandatory livestock premises registration law, which the U.S. Department of Agriculture (USDA) has adopted as a model for national use. USDA is working toward a national animal identification system that will allow officials to quickly determine the movements of individual animals from birth.

Some diseases affect both domestic and wild animals; in those cases, coordination with the wildlife officials would be necessary. A disease outbreak of this sort would affect transportation agencies, because animals killed on roadways would have to be disposed of properly and the maintenance vehicles used in such operations would have to be decontaminated.

Transportation Biohazard Operational Concept

There may be concerns as to who would be responsible for certifying public and private vehicles as adequately decontaminated. Unaffected states would be keenly interested in ensuring that incoming vehicles and animals are free of disease.

The table below summarizes the following identified actions as likely responses to the scenario described above. Not all of these actions would require support from transportation agencies:

Action	Awareness	Prevention	Preparedness	Response	Recovery
Quarantine of affected farms				▲	
Crime scene investigation (FBI)				▲	
Investigation of movement of contaminated livestock				▲	
Activation of the State Emergency Operations Center (EOC), Federal EOC, and Federal				▲	
Issuance of national animal stop movement order (USDA)				▲	
Interim care of animals stopped in transit				▲	
Disposal of animal carcasses					▲
Decontamination of affected facilities and vehicles					▲